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ABSTRACT

The course on carpentry is divided into 14 sequential units, with several task packages within each, covering the following topics: carpentry hand tools; portable power tools; working machine tools; lumber; fasteners and adhesives; plans, specifications, and codes for houses; footings and foundations for a house; household cabinets; floor framing for a house; wall framing for a house; competencies and skills of roof framing for a house; installing exterior wall finishes including windows and door units; installation of ceilings, wall and floor coverings; and the final section, Unit 14, centering around the installing of interior trim, doors, and door hardware. Each unit includes a rationale, general and specific objectives, and a brief description of the learning activities to be supervised by an instructor and provide learning practice. Each activity or task package is organized under the headings of: prerequisites, rationale, objectives, learning activity, and learning practice and is keyed to supplementary audiovisual and textual materials. Successful completion of the required activities is usually necessary in order to progress to the next unit. (JB)

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DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

C-I

UNIT PACKAGE I: CARPENTRY HAND TOOLS

PREREQUISITES: NONE

RATIONALE:

A skilled craftsman must be able to select and properly use the appropriate tools for the job to be completed if he is to perform carpentry tasks effectively and skillfully. Your future success as a potential carpenter will also depend in part upon your ability to select and use hand tools accurately, efficiently, and safely. This unit has been designed to provide you with the opportunity to become familiar with many different types of carpentry hand tools which are frequently used in performing everyday carpentry tasks. The successful completion of the task packages in the unit will enable you to perform more complex building tasks later in the course. Continue by reading the General Objective for the unit and the Specific Objective for each task package. Your attention is then directed to the Learning Activity which will indicate to you what you are to do and how to proceed in the completion of this unit.

OBJECTIVES:

General:

Upon completion of this unit you will be able to use carpentry hand tools with a degree of skill and confidence.

Specific:

Upon completion of the task packages for this unit you will be able to:

OBJECTIVES (cont'd):

1. Read and use correctly a folding wood rule, layout tape rule, and a combination square to measure stock to the nearest 1/16 inch for the folding wood rule and combination square, and to an accuracy of 1/8 inch using the layout tape.
2. Copy and transfer angles, using a sliding T-bevel, by setting the angle on a framing square, protractor, or by transferring the angle from a piece of stock to an accuracy of ± 1°.
3. Read the linear scales of the framing square to an accuracy 1/16 inch and to check the squareness of inside and outside corners for a 90° angle.
4. Use a carpenter's level to check a vertical wall for plumbness and a flat surface for levelness. The acceptable standard is reached when the bubble settles between the marked lines.
5. Use the crosscut saw to cut stock so that the cut is on the waste side of the line, is straight and clean, is square with the face of the board, ± 2°, and the stock is not chipped or split at the end of the cut.
6. Use a keyhole saw to cut a rectangular opening in a piece of stock so that the cut is square with the face of the board, ± 2°, is straight and clean, and is on the waste side of the line.

OBJECTIVES (cont'd):

7. Use the coping saw to cope a joint on a piece of molding with no more than a 1/32 inch space showing when the joint is assembled.
8. Use the miter box saw to make square and angular cuts on a piece of stock on the waste side of the line to an accuracy of ± 1°.
9. Use the hacksaw for cutting metal molding to an accuracy of ± 1/32 inch.
10. Adjust and use the block and jack planes to remove stock on the edge and end grain, leaving a uniform line showing, planing square with the face of the board to an accuracy of ± 2°, and leaving no chips or cuts in the stock at the end of the cut.
11. Use the "carpenter's" hatchet for cutting and chopping stakes in conformity with a model stake provided by the instructor.
12. Care for and use wood chisels on stock to remove material to a specified depth of ± 1/32 inch, leaving an even guide line showing, and without splintering the stock.
13. Use the brace for boring holes with auger and expansive bits in stock so that the hole will be of the correct size and position, square to the surface ± 2°, and without splinters on the back of the stock.

OBJECTIVES (cont'd):

14. Select and use a standard screwdriver and spiral ratchet (yankee) screwdriver so that the tip snugly fits the screw slot and the screw is driven in accordance with criteria established by the instructor.
15. Select and use hammers to drive head and headless nails straight and true without damaging the surface of the stock and to withdraw nails without marring the surface.

LEARNING ACTIVITY:

In order to complete this unit successfully you should begin your work on Task Package 1, and then as a suggestion proceed to complete each task package in order until you have finished each of the 15 packages in the unit. You will notice, however, that some of the packages do not have a prerequisite; therefore, they may be done out of numerical order. In the packages you will be asked to view a sound-slide presentation, read and answer questions, and perform some practical exerices. The number and names of the task packages included in this unit are as follows:

TASK PACKAGE 1: BASIC MEASURING DEVICES
TASK PACKAGE 2: SLIDING T-BEVEL
TASK PACKAGE 3: FRAMING SQUARE
TASK PACKAGE 4: CARPENTER'S LEVEL
TASK PACKAGE 5: CROSSCUT SAW

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 6: KEYHOLE SAW

TASK PACKAGE 7: COPING SAW

TASK PACKAGE 8: MITER BOX SAW

TASK PACKAGE 9: HACKSAW

TASK PACKAGE 10: BLOCK AND JACK PLANES

TASK PACKAGE 11: CARPENTER'S HATCHET

TASK PACKAGE 12: WOOD CHISELS

TASK PACKAGE 13: BRACE AND BITS

TASK PACKAGE 14: STANDARD AND SPIRAL RATCHET SCREWDRIVERS

TASK PACKAGE 15: HAMMERS

At this point, should you feel able to pass a comprehensive test over the carpentry hand tools covered in this unit, contact your instructor. However, should you feel that you are not ready [illegible] in your work as outlined above.

UNIT I: CARPENTRY AND TOOLS

TASK PACKAGE #1: BASIC MEASURING DEVICES

PREREQUISITES: NONE

RATIONALE:

From the days of the early Egyptians, measuring devices have been necessary for determining distances in order for construction dimensions to be accurate. Think of the length of time that the pyramids have stood; their durability is largely due to the accuracy of the measuring tools as well as to the strength of the material from which they were made.

Today, the steel tape, the folding wood rule, and combination square are indispensable measuring devices that the carpenter uses regularly. Steel tapes are important tools which are frequently used by carpenters in laying out building lines on the job site. The folding wood rule is the basic measuring tool used by the carpenter, and he must know how to use this rule if he is to perform even the most simple carpentry tasks on the job. The combination square is an indispensable device for measuring short distances and for transferring a number of equal distances. In completing this task package, start by reading the Objective and then do the Learning Activities and Learning Practice.

RATIONALE (cont'd):

The Objective sets forth your goal; therefore, as you perform the required task, keep this Objective clearly in mind.

OBJECTIVE:

Upon completion of this task package you will be able to read and use correctly a folding wood rule, layout tape rule, and a combination square; and to measure stock to the nearest 1/16 inch for the folding wood rule and combination square, and to an accuracy of 1/8 inch using the layout tape.

LEARNING ACTIVITY:

1. Begin your Learning Activities by going to the resource center and viewing slide sound package #C-I-1.
2. Read Modern Carpentry, pages 8 through 10. Take note of the appearance and the name of the various measuring devices. Make a complete list of all of the measuring tools you find and retain this list.
3. Read Modern Carpentry, page 45, 1st column, which presents a discussion of the measuring tape. Observe figure 3-6. Which pictured tape blade most nearly resembles the graduations on the 100 foot tape issued to

LEARNING ACTIVITY (cont'd):

you? A, B, C, or D? Why? Keep these answers, to be turned in later.

4. Read Fundamentals of Carpentry, Volume I, pages 13 and 14, about the combination square. Why is it a handy measuring device? Write your answer and retain.

5. This completes your Learning Activity. Take your paper to your carpentry instructor for his reaction, then, at his recommendation, proceed to the Learning Practice.

LEARNING PRACTICE:

1. Observe your instructor's demonstration of the uses of the 100 foot tape, the folding wood rule, and combination square. Then be prepared to demonstrate the use of [illegible] when your instructor requests you to do so.

2. Make and record the following measurements to the nearest 1/16" [illegible] indicated in the following exercise. Accuracy is important in this exercise, so be careful in making your measurements. When you use the 100 foot tape you may have one of your classmates to hold one end of your tape. If you find in making your measurements that you are having trouble with common fractions and fractions and

LEARNING PRACTICE (cont'd):

mixed numbers, refer to Mathematics for Vocations, Packages #1 and #2.

MEASUREMENT

a. Using the folding wood rule, measure to the nearest 1/16" the following dimensions of the laboratory table and door casement.

1. height of table top above the floor ________ ft. ________ in.
2. width of table top ________ ft. ________ in.
3. length of table top ________ ft. ________ in.

b. Using the combination square, measure to the nearest 1/16" the lumber samples provided by your instructor.

1. width of 1" x 12" stock ________ ft. ________ in.
2. thickness of 1" x 12" stock ________ ft. ________ in.
3. width of 1" x 6" stock ________ ft. ________ in.

LEARNING PRACTICE (cont'd):

4. thickness of 1" x 6" stock ________ ft. ________ in.

5. width of 2" x 4" stock ________ ft. ________ in.

6. thickness of 2" x 4" stock ________ ft. ________ in.

c. Using the 100 foot tape, measure to the nearest 1/8".

1. length of the carpentry laboratory ________ ft. ________ in.

2. width of the carpentry laboratory ________ ft. ________ in.

3. Now have your instructor check your work to see how well you have met the Objective. If you have successfully completed the Objective, he will indicate to you to proceed to the next task package. If not, he will recommend a procedure for you to follow.

4. Congratulations! You've passed the first milestone.

C-I-2

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE #2: SLIDING T-BEVEL

PREREQUISITES: UNIT I, TASK PACKAGE 1

RATIONALE:

In his work the carpenter finds the sliding T-bevel to be an indispensable tool in measuring and transferring angles. It is a very useful device in laying out cuts for house rafters and has a variety of other uses. Without the T-bevel the carpenter's job would be more difficult and in some cases almost impossible to perform. In completing this task package, continue on by reading the objective and doing the Learning Practice and Learning Activity. Keep sight of your goal by referring to the objective as often as necessary. If you set sail early, you will arrive in plenty of time to enjoy yourself.

OBJECTIVE:

Upon completion of this task package you will be able to copy and transfer angles, using a sliding T-bevel, by setting the angle on a framing square, protractor, or by transferring the angle from a piece of stock, to an accuracy of ± 1°.

LEARNING ACTIVITY:

1. View slide-sound package #C-I-2. ____
2. Read *Modern Carpentry*, page 9, second column, and look at Fig. 1-3, page 10. State in writing one common use of the sliding T-bevel and keep until later.
3. Read *Fundamentals of Carpentry*, Volume 1, pages 15 and 16, concerning the sliding T-bevel, and refer to the illustration of this tool on page 14. Describe how the tool is to be used and keep this answer.
4. Go now to your instructor and let him see your answers to numbers 2 and 3 above. Upon his direction, proceed to the *Learning Practice*.

LEARNING PRACTICE:

1. Fig. 1, page 4 of this task package, the sliding T-bevel, study the names of its parts.
2. Referring to Fig. 2 and using a sliding T-bevel and a square (provided by your instructor), adjust the blade to a 45° angle with the handle.
   a. What were the measurements used on the square? a. ______________________
   b. Why did this produce a 45° angle? b. ______________________

____

____

LEARNING PRACTICE (cont'd):

3. Adjust the sliding T-bevel to a 60° angle. What measurements were used on the square? ____________________ Check your setting against a known 60° angle in the manner shown in the Fig. 3. (Obtain a protractor from your teacher.)
4. From your instructor secure three pieces of stock with angles cut on one end. Adjust your sliding T-bevel to conform to the angle on the piece of stock marked #1. (Note - Make sure the handle is placed along the edge of the stock and the blade along the angle on the end of the stock.) Transfer this angle to the other end of the stock and mark it with a pencil along the edge of the blade.
5. Using the procedure set forth in step #4, copy the angle on the piece of stock marked #2 and transfer this angle to the opposite end of this piece of stock.
6. Following the same procedure, copy the angle on the block #3 and transfer this angle to the opposite end of this stock.
7. Have your instructor check the accuracy of your responses.
8. If this package was completed to the satisfaction of your instructor, move on to package #3.
9. Right on!

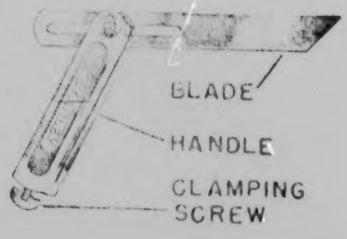

BLADE
HANDLE
CLAMPING SCREW

Figure 1

e 2

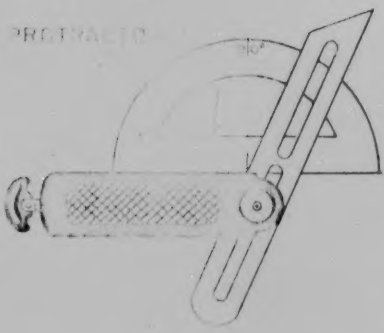

PROTRACTOR
90°

Figure 3

C-I-3

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE # 3: FRAMING SQUARE

PREREQUISITES: UNIT I, TASK PACKAGE # 1

RATIONALE:

Are you aware that one of the most versatile tools in the carpenter's tool kit is his framing square and that only the most experienced craftsman knows how to fully use it? In this task package you will begin to employ the framing square by measuring distances and checking angles. Certainly this is not all that can be done with this valuable tool, but it is all you will be required to do now. In completing this task package, continue by reading the Objective and doing the Learning Activity and Learning Practice, referring back to the Objective as often as necessary to make sure you have completed your task. If you like the outdoors and working with your hands as well as your mind, carpentry may really be your bag.

OBJECTIVE:

Upon completion of this task package you will be able to read the linear scales of the framing square to an accuracy of 1/16 " and to check the squareness of inside and outside corners for a 90° angle.

LEARNING ACTIVITY:

1. View slide sound package # C-I-3.
2. Read Fundamentals of Carpentry, Volume I, pages 73, 74, and to the middle of page 75. Observe figure 1 and note the names of the parts of the square. Also check the divisions into which each part is divided.
3. Be sure to go back to review Task Package #1, if you feel you are unsure of proper measuring procedures.
4. This completes your learning activity; begin work on the Learning Practice.

LEARNING PRACTICE:

1. Go to the carpentry laboratory and you will be given a framing square and a length of 2 x 4 by your instructor. With the body of the framing square held against the edge of the 2 x 4 as shown in figure 1, mark a line along the tongue across the face of the stock.

LEARNING PRACTICE (cont'd):

2. Place the framing square in the position shown in figure 2, with the inside of the body against the edge of the 2 x 4 so that the 16" division is aligned with the first mark drawn. Mark a line along the inside of the tongue.
3. The distance between your drawn lines should be 16". Check this distance with a folding wood rule; if correct, move on to number 4; if you were wrong go back to number 1 of the Learning Practice and repeat the process again.
4. Figure 8-38 on page 153 in Modern Carpentry shows a man using a framing square to check the squareness between a ceiling joist and a beam. (This is an example of checking an inside corner.)
5. Figure 3 in this task package shows a framing square being used to check an outside angle on a piece of stock.
6. Take the framing square and check the four corners of the laboratory table top to determine if these corners form a 90° angle. Also use the framing square to check the angles formed by the legs against the under side of the table.
7. Show your instructor the 2 x 4 you marked and report to him your findings on the squareness of the laboratory table. If your work has been completed in a satisfactory manner, he will direct you to the next task package.
8. A packet learned is a packet earned!

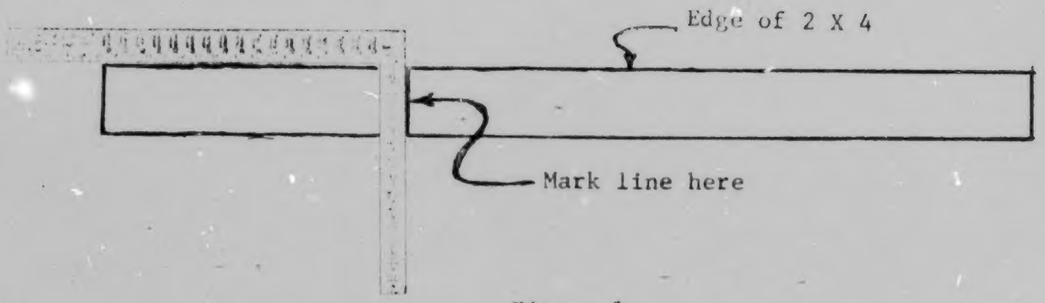

Edge of 2 X 4
Mark line here

Figure 1

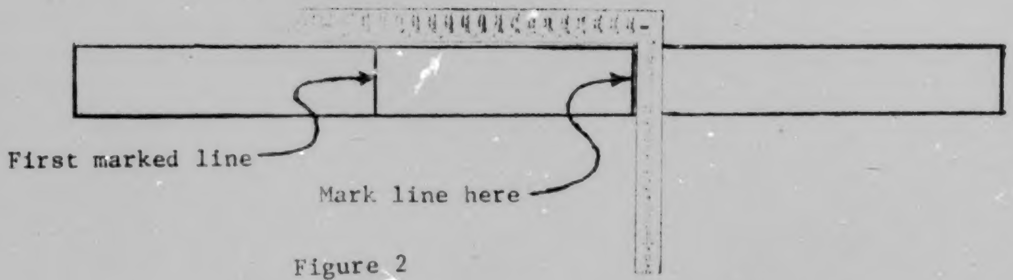
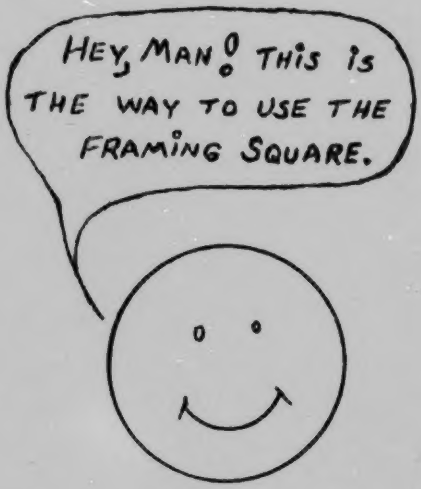

First marked line
Mark line here

Figure 2

Figure 3


HEY, MAN! THIS IS THE WAY TO USE THE FRAMING SQUARE.

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE 4: CARPENTER'S LEVEL

PREREQUISITES: NONE

RATIONALE:

In order to perform the various tasks that are required of carpenters on the job site, it is necessary to develop basic skills in the proper use of many different hand tools. One such tool is the carpenter's level. In this task package you will use this device to determine whether or not a surface is level. Ready to go? O.K., then read the Objective and do the Learning Activity and the Learning Practice. Refer back to the Objective as often as necessary because as you know, it sets forth your goal for this task package. Are you ready to level with this assignment now?

OBJECTIVE:

Upon completion of this task package you will be able to use a carpenter's level to check a vertical wall for plumbness and a flat surface for levelness. The acceptable standard is reached when the bubble settles between the marked lines.

LEARNING ACTIVITY:

1. View sound-slide package C-I-4.
2. Read page 15 in Fundamentals of Carpentry, Volume 1, concerning the level; also refer to figure 5 where the level is pictured. Read carefully the definition of level on page 15 in the back of the above reference. Discuss your reading with a fellow student.
3. This completes your Learning Activity. Proceed to the carpentry laboratory and continue by completing the Learning Practice.

LEARNING PRACTICE:

1. Secure a carpenter's level from your instructor and perform the following jobs:
2. Place the edge of the level against the side jamb of the entrance doorway to the carpentry laboratory. The level should be held vertically and in the manner shown in Figure 17 - 5, page 363 of Modern Carpentry. Check the position of the bubble that is visible and runs in a horizontal direction. Has the bubble settled between the marked lines? If so, the side jamb is said to be plumb; if not, it is out of plumb.
3. If the jamb is out of plumb, step 2 above, alternately move each end of the level slightly away from the jamb, but keeping the other end against it. Observe the bubble closely. When the bubble settles between the lines, the jamb is plumb. Record on paper the approximate fractional part of an inch that the jamb is out of plumb.

LEARNING PRACTICE (cont'd):

4. Check the other side jamb of this doorway following the procedure outlined in numbers 2 and 3 of the Learning Practice. Record your answer as before. (Note: The level is a delicate tool; if dropped it could be seriously damaged and the glass broken.)
5. With the level held against the top jamb of the doorway similar to Figure 11 - 35, page 230 in Modern Carpentry, read the bubble that is visible in the long tube. If the bubble settles between the lines, the top jamb is said to be level. If it is not level, move each end in succession (as you did on the side jamb) until the bubble is centered between the lines. Record the approximate distance, if any, that the top jamb is out of level.
6. Let your instructor check your answers. If you did not complete the Learning Practice successfully you will be requested to repeat it again.
7. So you completed it correctly; great! Move on to task package 5.
8. Oh, by the way, did you know that "A packet this day keeps the instructor away."

C-I-5

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE #5: CROSSCUT SAW

PREREQUISITES: UNIT I, TASK PACKAGES 1 AND 3

RATIONALE:

In his work the carpenter must use a variety of hand tools. One of the tools he makes frequent use of is his crosscut saw. Although it is true that many of the jobs formerly performed with the crosscut saw are now done by various power saws, there still are many jobs that would be difficult if not impossible to do with anything other than the crosscut saw. You cannot be considered truly skilled unless you can use this saw with confidence. You will begin acquiring this skill by completing this task package. Proceed by reading the objective carefully and performing the Learning Activity and Learning Practice. By frequent checking of the objective you will be able to determine how well you are attaining the required skills. Now is the time to explore the possibilities of carpentry as a means of livelihood.

OBJECTIVE:

Upon completion of this task package you will be able to use the crosscut saw to cut stock so that the cut is on the waste side of the line, is straight and clean, is square with the face of the board, ± 2°, and the stock is not chipped or split at the end of the cut.

LEARNING ACTIVITY:

1. View slide sound package #C-I-5 and TT-9.
2. Read carefully and study the section on saws pages 10 and 11 in Modern Carpentry. Compare the crosscut saw and the ripsaw to each other on such items as number of teeth, shape of teeth, shape of kerf, and proper use of each saw. Write your answers and be prepared to hand them in to your instructor later.
3. Study carefully pages 16, 17 to section on the ripsaw on page 18 in Fundamentals of Carpentry, Volume 1.
4. This completes the Learning Activity; move on to the Learning Practice.

LEARNING PRACTICE:

1. Turn in your Learning Activity paper to your instructor for his reaction and comments and, if it is completed satisfactorily, he will provide you with a crosscut saw, a combination square, a folding wood rule, and a piece of 1" x 4" stock.

LEARNING PRACTICE (cont'd):

2. Study carefully the chart accompanying this task package. Pay particular attention to the portion of the chart dealing with the use of the crosscut saw.

3. Using your folding wood rule, measure 2" in from one end of the stock and square a line across the face, using the combination square and pencil.

4. Place the stock in a woodworking vise (as pictured on the accompanying chart) and proceed to make a cut across the face of the stock. (Note - Make sure the cut is begun on the pull stroke, the saw is held at approximately a 45° angle, an even stroke is used, the cut is made on the waste side of the line (on the 2" side), and that you don't split the stock on the end of the cut.

[illegible] squareness with a combination square or a framing square.

6. Remember [illegible] cuts fingers easier than it will cut wood, so be sure to keep them clear of the teeth while the cut is being made.

7. Lay off a [illegible] angle on the face of your stock, measuring in 3" from the ~~end~~ opposite where the first cut was made. Start the angle at the 3" [illegible] draw toward the center of the stock.

8. Cut the [illegible] along the 45° angle with the waste side between the line and [illegible] side from which you measured. Proceed with this

LEARNING PRACTICE (cont'd):

cut as outlined in step 4 of the Learning Practice.

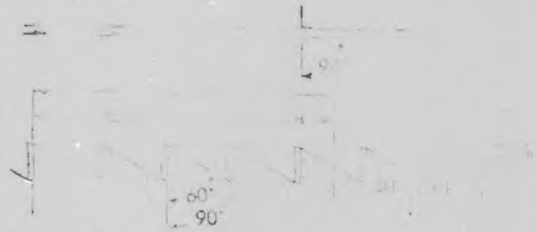
*Note - Saw teeth are easily dulled; avoid letting the teeth hit metal, or other hard objects.

9. Now, let's check your own work against the Objective. If you determine that you did not meet the standards you may want to repeat the Learning Practice again. If you did acceptable work let your instructor evaluate your finished job.

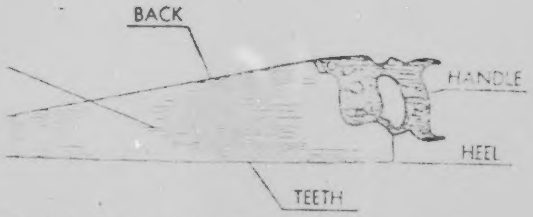
10. If you have performed the sawing operation in a satisfactory manner you will be directed to the next task package.

11. Congratulations! You're really digging it. Or, rather, sawing it.

HOW TO USE HAND SAWS

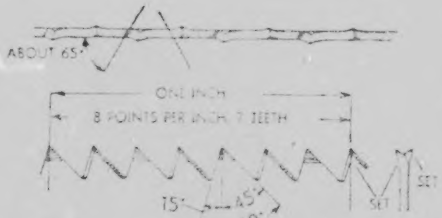


R[illegible] T[illegible]



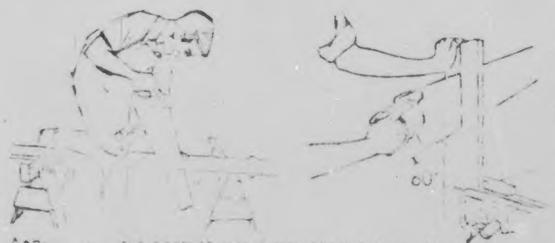
BACK
HANDLE
HEEL
TEETH

THE SIZE OF A SAW IS DETERMINED BY THE LENGTH OF THE BLADE IN INCHES
[illegible] POPULAR SIZES ARE 24" AND 26"
THE COARSENESS OR FINENESS OF A SAW IS DETERMINED BY THE NUMBER OF POINTS PER INCH
A COARSE SAW IS BETTER FOR FAST WORK AND FOR GREEN WOOD
A FINE SAW IS BETTER FOR SMOOTH ACCURATE CUTTING AND FOR DRY SEASONED WOOD
[illegible] 6 POINTS ARE IN COMMON USE FOR RIP SAWS
7 AND 8 POINTS ARE IN COMMON USE FOR CROSS CUT SAWS
SAW TEETH ARE SET. EVERY OTHER TOOTH IS BENT TO THE RIGHT AND THOSE [illegible] TO THE LEFT, TO MAKE THE KERF WIDER THAN THE SAW
[illegible] PREVENTS THE SAW FROM BINDING IN THE KERF OR SAW CUT
[illegible] SAWS IN ADDITION ARE TAPER GROUND, BEING THINNER AT THE BACK THAN AT THE TOOTHED EDGE
KEEP SAW TEETH SHARP AND PROPERLY SET

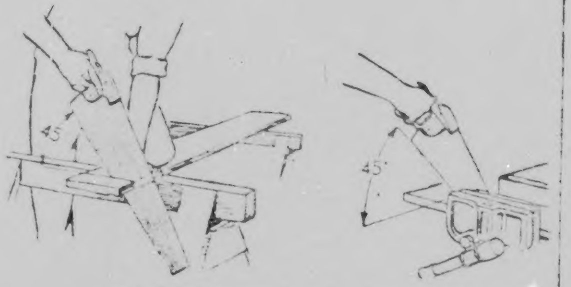


ABOUT 65°
ONE INCH
8 POINTS PER INCH, 7 TEETH
15°
45°
60°
SET
SET

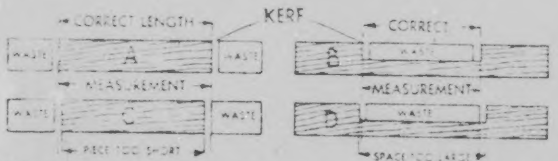
CROSS CUT SAW TEETH ARE LIKE KNIFE POINTS. THEY CUT LIKE TWO ROWS OF KNIFE POINTS AND CRUMBLE OUT THE WOOD BETWEEN THE CUTS



ABOUT [illegible] IS THE CORRECT ANGLE BETWEEN THE SAW AND THE WORK FOR RIP SAWING

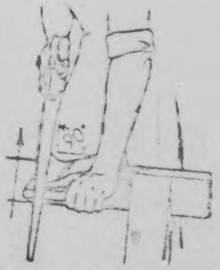


ABOUT 45° IS THE CORRECT ANGLE BETWEEN THE SAW AND THE WORK FOR CROSS CUT SAWING

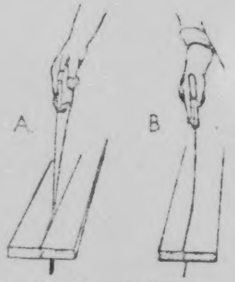


CORRECT LENGTH
KERF
CORRECT
WASTE
A
WASTE
B
WASTE
MEASUREMENT
MEASUREMENT
WASTE
C
WASTE
D
WASTE
PIECE TOO SHORT
SPACE TOO LARGE

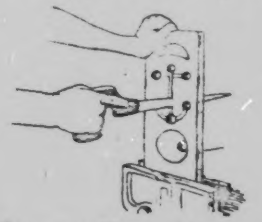
BE SURE TO SAW CAREFULLY ON THE WASTE SIDE OF THE LINE AS AT A AND B. SAWING ON THE LINE OR ON THE WRONG SIDE OF THE LINE MAKES THE STOCK TOO SHORT AS AT C OR THE OPENING TOO LARGE AS SHOWN AT D



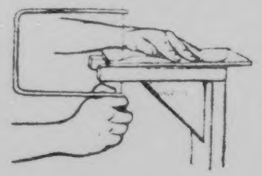
START THE SAW CUT BY DRAWING THE SAW BACKWARD. HOLD THE BLADE SQUARE TO THE STOCK. STEADY IT AT THE LINE WITH THE THUMB



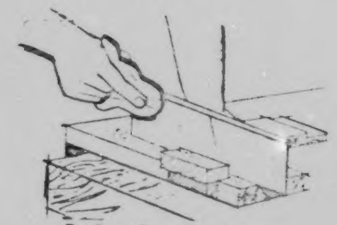
A. IF THE SAW LEAVES THE LINE TWIST THE HANDLE SLIGHTLY AND DRAW IT BACK TO THE LINE
B. IF THE SAW IS NOT SQUARE TO THE STOCK, BEND IT A LITTLE AND GRADUALLY STRAIGHTEN IT. BE CAREFUL NOT TO PERMANENTLY BEND OR KINK THE BLADE



COMPASS OR KEYHOLE SAWS ARE USED TO CUT CURVED OR STRAIGHT SIDED HOLES



THE COPING SAW IS USED TO CUT IRREGULAR SHAPES AND INTRICATELY CURVED PATTERNS IN THIN WOOD



THE BACK SAW IS A THIN CROSS CUT SAW WITH FINE TEETH, STIFFENED BY A THICK BACK. A POPULAR SIZE IS 12" WITH 14 PTS PER INCH. IT IS USED FOR FINE ACCURATE WORK

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C-I-6

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE #6: KEYHOLE SAW

PREREQUISITES: UNIT I, TASK PACKAGES 1, 3, 5

RATIONALE:

Quite often in his work the carpenter finds it necessary to cut a rectangular opening in stock without cutting through to the outside edges. One such case would be the rectangular opening cut in sheet rock so the outlet box can be inserted through the opening. The tool most commonly used for performing this job would be the keyhole saw. It is desirable that you become skillful in using this tool, and you will be provided with the opportunity to develop this skill as you do the job outlined in this task

Continue by reading the Objective and doing the Learning Activity and Learning Practice. Return to the Objective as often as necessary for it serves as your guide for reaching the goal. Now is your chance to discover how fast your interest in carpentry is growing.

OBJECTIVE:

Upon completion of this task package you will be able to use the keyhole saw to cut a rectangular opening in a piece of stock so that the cut is square with the face of the board ± 2°, is straight and clean, and is on the waste side of the line.

LEARNING ACTIVITY:

1. View slide sound package #C-I-5.
2. Read section on the keyhole saw on page 18 in Fundamentals of Carpentry, Volume 1.
3. Review the chart which accompanies this task package. Note the illustration of the keyhole saw; holes were bored first to provide access for the saw blade.

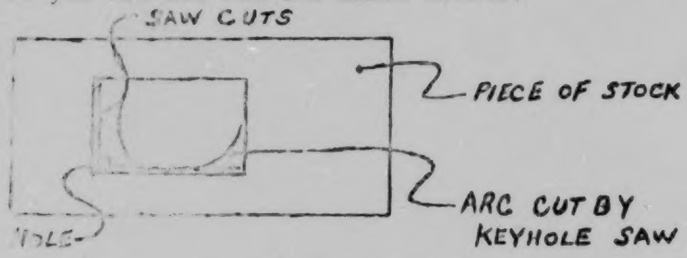
Proceed now to the Learning Practice.

LEARNING PRACTICE:

1. Your instructor will issue you a piece of stock with a hole drilled in it, a keyhole saw, a folding wood rule, and a combination square.
2. Lay out a rectangular opening that is 2" x 4" so that the hole is located inside one of the corners. (The hole should just touch both lines of a corner.)

LEARNING PRACTICE (cont'd):

3. Clamp the stock in a woodworking vise and begin sawing by inserting the blade into the hole and starting sawing on the pull stroke. Saw to the inside (waste side) of the 4" line, leaving an even line, and keeping the cut at right angles to the surface of the stock.
4. Withdraw the saw blade and replace it in the hole again. Saw the 2" line as you did the 4" one.
5. Now comes the hard part!
6. Insert the saw into the cut made along the 4" side; by sawing and turning the saw at the same time, cut an arc so you can reach the uncut 2" line. Refer to the illustration below. Proceed to cut along the 2" line. Remove the saw and reverse directions so you can cut out the small corner.



7. Following the above procedure, cut along the remaining line and remove all material from the opening.
8. To check your work, evaluate yourself by checking the objective. If you have completed the job satisfactorily, have your instructor check your work. If you and/or your

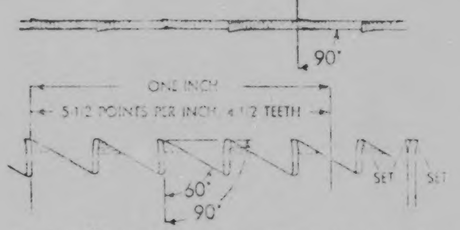
LEARNING PRACTICE (cont'd):

instructor feel you have not completed the sawing exercise with sufficient skill, you should repeat the Learning Practice.

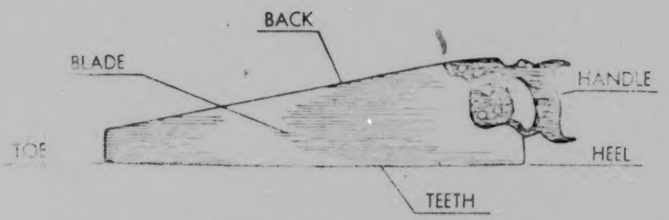
9. When you have completed this sawing exercise in an acceptable manner, move on to task package #7.

10. You didn't know you could do it, did you? But, you did the whole thing!

HOW TO USE HAND SAWS


90°
ONE INCH
5 1/2 POINTS PER INCH, 4 1/2 TEETH
60°
90°
SET
SET

RIP SAW TEETH ARE SHAPED LIKE CHISELS. THEY CUT LIKE A GANG OF CHISELS IN A ROW


BACK
BLADE
HANDLE
TOE
HEEL
TEETH

THE SIZE OF A SAW IS DETERMINED BY THE LENGTH OF THE BLADE IN INCHES

THE POPULAR SIZES ARE 24" AND 26"

THE COARSENESS OR FINENESS OF A SAW IS DETERMINED BY THE NUMBER OF POINTS PER INCH

A COARSE SAW IS BETTER FOR FAST WORK AND FOR GREEN WOOD

A FINE SAW IS BETTER FOR SMOOTH ACCURATE CUTTING AND FOR DRY SEASONED WOOD

[illegible] AND 6 POINTS ARE IN COMMON USE FOR RIP SAWS

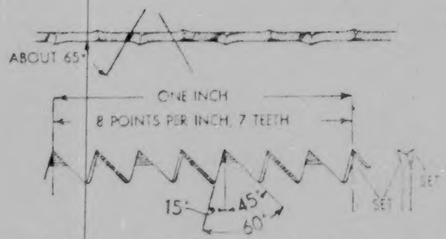
[illegible] AND 8 POINTS ARE IN COMMON USE FOR CROSS CUT SAWS

SAW TEETH ARE SET, EVERY OTHER TOOTH IS BENT TO THE RIGHT AND THOSE BETWEEN TO THE LEFT, TO MAKE THE KERF WIDER THAN THE SAW

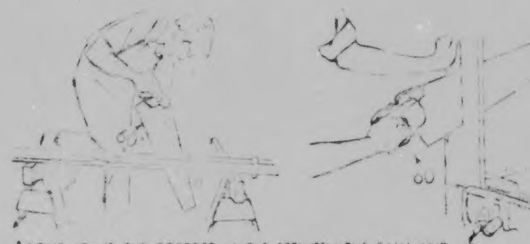
THIS PREVENTS THE SAW FROM BINDING IN THE KERF OR SAW CUT

QUALITY SAWS IN ADDITION ARE TAPER GROUND, BEING THINNER AT THE BACK THAN AT THE TOOTHED EDGE

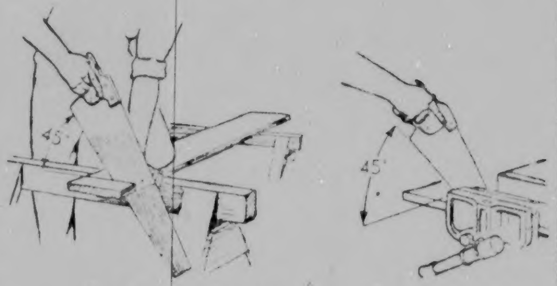
KEEP SAW TEETH SHARP AND PROPERLY SET


ABOUT 65°
ONE INCH
8 POINTS PER INCH, 7 TEETH
15°
45°
60°
SET
SET

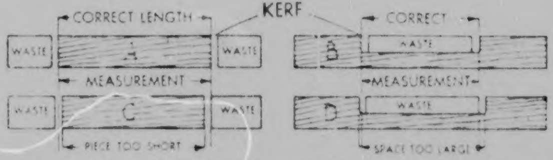
CROSS CUT SAW TEETH ARE LIKE KNIFE POINTS. THEY CUT LIKE TWO ROWS OF KNIFE POINTS AND CRUMBLE OUT THE WOOD BETWEEN THE CUTS



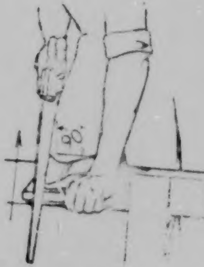
ABOUT 60° IS THE CORRECT ANGLE BETWEEN THE SAW AND THE WORK FOR RIP SAWING



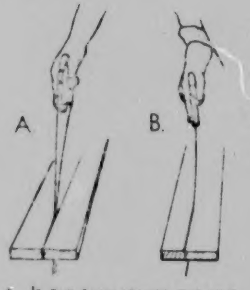
ABOUT 45° IS THE CORRECT ANGLE BETWEEN THE SAW AND THE WORK FOR CROSS CUT SAWING


CORRECT LENGTH
KERF
CORRECT
WASTE
A
WASTE
B
WASTE
MEASUREMENT
MEASUREMENT
WASTE
C
WASTE
D
WASTE
PIECE TOO SHORT
SPACE TOO LARGE

BE SURE TO SAW CAREFULLY ON THE WASTE SIDE OF THE LINE AS AT A AND B. SAWING ON THE LINE OR ON THE WRONG SIDE OF THE LINE MAKES THE STOCK TOO SHORT AS AT C OR THE OPENING TOO LARGE AS SHOWN AT D.

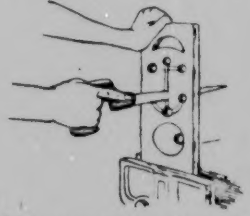


START THE SAW [illegible] DRAWING THE SAW [illegible] HOLD THE BLADE SQUARE [illegible] STOCK. STEADY IT AT THE [illegible] WITH THE THUMB

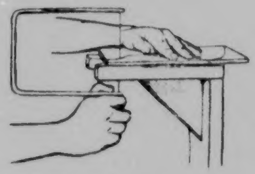


A. IF THE SAW LEAVES THE LINE TWIST THE HANDLE SLIGHTLY AND DRAW IT BACK TO THE LINE

B. IF THE SAW IS NOT SQUARE TO THE STOCK, BEND IT A LITTLE AND GRADUALLY STRAIGHTEN IT. BE CAREFUL NOT TO PERMANENTLY BEND OR KINK THE BLADE



COMPASS OR KEYHOLE SAWS ARE USED TO CUT CURVED OR STRAIGHT SIDED HOLES



THE COPING SAW IS USED TO CUT IRREGULAR SHAPES AND INTRICATELY CURVED PATTERNS IN THIN WOOD

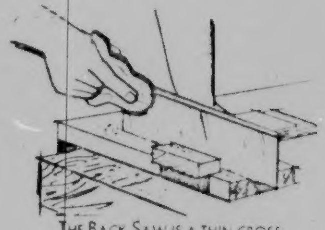


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CHART NO. 19

BY R. O. REGER

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UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE 7: COPING SAW

PREREQUISITES: UNIT I, TASK PACKAGES 1,3,5 and 6

RATIONALE:

The coping saw is a very valuable hand tool which the carpenter has at his disposal, and its uses are many and varied. The carpenter finds the coping saw particularly useful when he cuts a piece of molding to fit an inside corner. This operation is called coping a joint and is used whether the molding is baseboard, shoe, or crown. Being able to execute this kind of joint sets the carpenter apart from the amateur. In this task package you will learn how to perform this operation, as well as developing skill in using the coping saw. In completing this task package, continue by reading the Objective and doing the Learning Activity and Learning Practice. Refer back to the objective as often as necessary because it sets forth your goal. Have you decided that you can really cope with carpentry yet?

OBJECTIVE:

Upon completion of this task package you will be able to use the coping saw to cope a joint on a piece of molding with no more than a 1/32 inch space showing when the joint is assembled.

LEARNING ACTIVITY:

1. View sound slide package #C-I-7 and TT-9.
2. Read page 18, the article entitled the coping saw in Fundamentals of Carpentry, Volume 1.
3. Read and study carefully the section, Baseboard and Base Shoe, on pages 380 and 381 in Modern Carpentry. Discuss this section with a fellow student and explain to him how you would cope a joint.
4. If still uncertain as to the procedure, check with your instructor.
5. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

1. Go to your instructor and you will be issued a coping saw, two short pieces of baseboard, a combination square, and a crosscut saw.
2. Following the procedure outlined on pages 380 and 381 in Modern Carpentry, lay off a 45° angle on one of the pieces which, when cut, will reveal the contour of the molding. (Note this angle will be 45° to the edge of the stock and 90° to the face.)

LEARNING PRACTICE (cont'd):

3. Clamp the stock in a woodworker's vise and cut the 45° angle with a crosscut saw, making sure to cut on the waste side of the line.
4. With the contour thus revealed proceed to saw along this curve with your coping saw. (Note - It is important that you under cut your piece of molding while you are following the contour. Refer to Figure 17-55 in Modern Carpentry, which shows this procedure.)
5. Place the coped joint against the other piece of molding to determine if you have produced a joint showing no more than a 1/32 inch space.
6. If you "goofed" repeat the learning practice again. If you feel that the joint is correct let your instructor see it.
7. Upon satisfactory completion of the job you are to proceed to task package 8.
8. How many of your friends can do this?

C-I-8

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE 8: MITER BOX SAW

PREREQUISITES: UNIT I, TASK PACKAGES 1,3,5,6 and 7

RATIONALE:

In your experiences thus far in using the crosscut, keyhole, and coping saws, you had to "freehand" your cut. In this package you will be able to use a device which is equipped with a guide system which will assure that the cut is made according to a predetermined angle and also square with the face of the stock. No doubt you can readily see the many time saving advantages that the miter box saw provides, as well as the improvement in accuracy. In completing this task package proceed by reading the objective and performing the Learning Activity and the Learning Practice, referring back to the objective as often as necessary.

OBJECTIVE:

Upon completion of this task package you will be able to use the miter box saw to make square and angular cuts on a piece of stock on the waste side of the line to an accuracy of ±1°.

LEARNING ACTIVITY:

1. View slide sound package #C-I-8.
2. Read Modern Carpentry, page 11, concerning the miter box saw.
3. Read the section entitled the Miter Box on page 28 in Fundamentals of Carpentry, Volume 1. Also read page 47, How to Make a Miter Box. List in writing two advantages that the miter box has over the crosscut saw and save these answers.
4. This completes your Learning Activity; continue on with the Learning Practice.

LEARNING PRACTICE:

1. Secure a piece of 3/4" stock and a combination square from your instructor.
2. Mark 45° angles on each end of the stock, completely across the face, and running in different directions.
3. Attach the stock to the miter box, using its clamping devices, and adjust the saw to 45° to the left by reading the protractor gauge on the miter box front. (Note - Make sure the stock with the correct marked angle is located here.)
4. Saw the 45° angle on the waste side of the line and then check the angle with the 45° angle on the combination square.
5. Replace the stock in the miter box so that you will be able to cut the other angle when the saw is adjusted 45° to the right.
6. Cut this angle on the waste side of the line and check it with the

LEARNING PRACTICE (cont'd):

combination square.

7. Square a line across the face approximately in the middle of the stock.
8. Place the stock in the miter box and adjust the saw to a 90° angle. Saw your wood at this angle (leaving a line showing) and check the accuracy with the combination square.
9. Turn in your answers to the questions in the Learning Activity and your sawing exercises to the instructor for evaluation. If you completed the work satisfactorily you will be directed to the next task package; if not, you will be asked to repeat certain portions of the work again.
10. You got it all correct; great! Let the good work roll!

C-I-9

UNIT I: CARPENTRY HANDTOOLS

TASK PACKAGE 9: HACKSAW

PREREQUISITES: UNIT I, TASK PACKAGES 1,3,5,6,7, and 8

RATIONALE:

Occasionally in his work it becomes necessary for the carpenter to cut metal with the hacksaw. An example of this kind of work would be the cutting of kitchen cabinet molding or the metal threshold. The procedure for cutting with the hacksaw is similar to that used with the other saws you have worked with so far and you will be expected to develop a degree of skill when using it. In completing this task package, continue by reading the Objective, and doing the Learning Activity and Learning Practice. Metal, as well as wood, becomes your friend in carpentry.

OBJECTIVE:

Upon completion of this task package you will be able to use the hacksaw for cutting metal molding to an accuracy of ±1/32 inch.

LEARNING ACTIVITY:

1. View sound slide package #C-I-9 and TT-9.
2. Read Modern Carpentry, page 11, concerning the hacksaw. List three items that are commonly cut with this saw.
3. Read Fundamentals of Carpentry, Volume 1, page 19, on the hacksaw.
4. This completes your Learning Activity; begin now with the Learning Practice.

LEARNING PRACTICE:

Tools & Equipment

1. A piece of flat metal
2. A hacksaw frame
3. A hacksaw blade
4. A combination square

1. Begin by inserting the blade into the saw so that the teeth point down and away from the handle and the holes at each end of the blade are placed over the pins on the frame. (Note - It may be necessary for you to adjust the frame to accommodate the length of the saw blade.) Tighten the wing nut by hand until you secure if firmly in place. (This should provide for adequate tension on the blade.)
2. Square a line across the face of your piece of metal 1 inch in from either end.

LEARNING PRACTICE (cont'd):

3. Clamp the piece of metal in a vise and begin your sawing on the waste side of the line by starting on the pull stroke. (The saw should be held in both hands, with one hand grasping the handle and the other the front edge of the frame.)
4. Continue your sawing, using an even, moderate stroke and holding the saw in a horizontal position. Pressure should be applied on the push stroke and released on the pull stroke. As the blade begins to come through the metal, ease up on the pressure and finish the cut. This will keep the teeth from chipping and produce a smoother cut.
5. Test the squareness of your cut with the combination square. If you feel you have satisfied the objective of this task package, turn in the finished job to your instructor. Also, give him the paper completed in the Learning Activity.
6. Upon his recommendation you will be directed to the next task package or asked to repeat the Learning Practice.
7. That's the way to hack it! Saw, that is.

C-I-10

UNIT I: CARPENTRY HANDTOOLS

TASK PACKAGE 10: BLOCK AND JACK PLANES

PREREQUISITES: UNIT I, TASK PACKAGES 1, 3, 5, AND 6 THROUGH 9

RATIONALE:

Quite often the carpenter has to remove a small amount of material from his stock to make the piece smooth or fit in a predetermined location. These operations are generally done with a block or a jack plane. Using these planes is quite an art, but use them you must if you are to become proficient with them. In this task package you will develop some skill in their use, and at the same time develop more confidence in yourself and your ability to handle tools with proficiency. Continue on by reading the Objective and doing the Learning Activities and Learning Practice. You may find it desirable to check the Objective frequently to make sure you are achieving your goal. In performing these tasks, you may discover how good your coordination is when your eyes, hands, and body muscles are working together.

OBJECTIVE:

Upon completion of this task package you will be able to adjust and use the block and jack planes to remove stock on the edge and end grain, leaving a uniform line showing, planing square with the face of the board to an accuracy of ± 2°, and leaving no chips or cuts in the stock at the end of the cut.

LEARNING ACTIVITY:

1. View slide sound package #C-I-10.
2. Read Modern Carpentry, pages 11, 12, and 13, which discusses the jack and block plane.
3. Read the coverage of the jack and block plane in Fundamentals of Carpentry, Volume 1, pages 20 through 23.
4. Study carefully the four charts included in this package. Frequent reference will be made to them in the Learning Practice, so a casual glance will not suffice.
5. After you have studied the charts in detail, discuss their contents with a fellow student.
6. This completes your Learning Activity. Proceed to the Learning Practice.

LEARNING PRACTICE:

Tools & Equipment

1. Piece of 3/4" stock	3. Jack plane
2. Block plane	4. Combination square

1. Lay off a line 1/8" in from one edge of the board. Now, square the line entirely around the piece of stock (the line should appear on both ends and on the other side as well).
2. Clamp the stock in the vise ready for planing. (Refer to chart #14).
3. Adjust the double plane iron for depth if necessary. (See chart #12).
4. Adjust the plane iron laterally, and to the correct depth, following the procedure covered on chart #13.
5. Using the jack plane, proceed to plane the stock down to the line as shown on chart #14. (Be sure to leave a uniform line showing and also be sure to plane with the grain).
6. To remove the stock from the other edge, mark off another 1/8" line around the wood. Plane the stock down to the line as you did in step #6, using the jack plane.
7. Lay off a 1/16" mark around each end of the stock. Clamp the workpiece in the vise and plane one end down to the 1/16" line, using the jack plane.

LEARNING PRACTICE (cont'd):

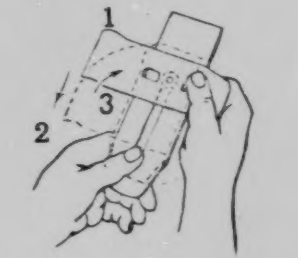
8. Plane the remaining end of the board with the block plane, following the procedure outlined on chart #15. (Note - make sure you adjust the block plane properly before beginning).
9. Check your finished job by referring back to the Objective.
10. If you completed the exercise satisfactorily, hand it in to your instructor for his rating.
11. You will either be directed to begin on the next task package or to repeat all or a portion of this assignment.
12. Can you believe you did the whole thing?

C-I-10

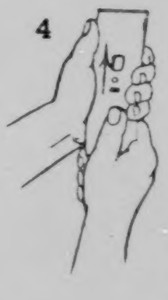
5

HOW TO ASSEMBLE THE

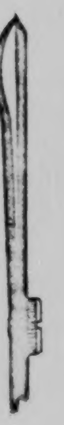
STANLEY DOUBLE PLANE IRON



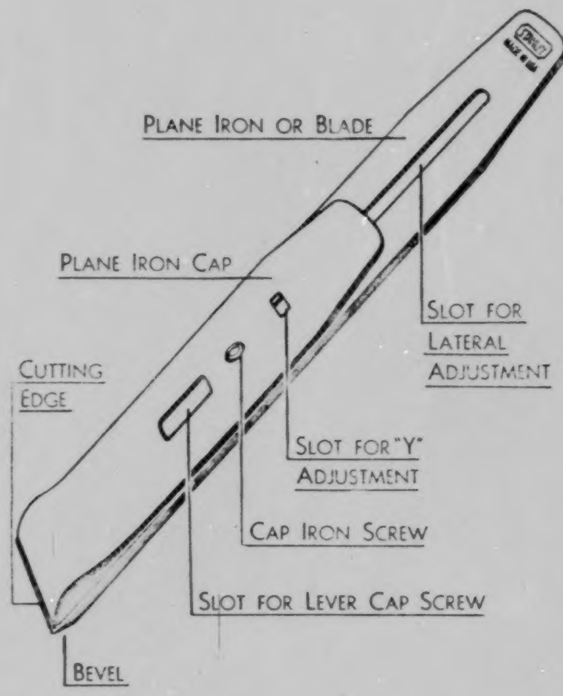
TO PUT THE PLANE IRON AND THE PLANE IRON CAP TOGETHER 1–LAY THE PLANE IRON CAP ON THE FLAT SIDE OF THE PLANE IRON, AS SHOWN WITH THE SCREW IN THE SLOT 2–DRAW THE PLANE IRON CAP BACK 3–TURN IT STRAIGHT WITH THE PLANE IRON

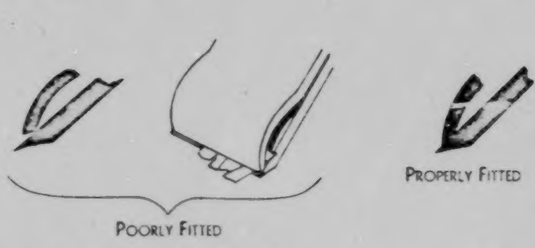


4–ADVANCE THE PLANE IRON CAP UNTIL THE EDGE IS JUST BACK OF THE CUTTING EDGE OF THE PLANE IRON. THE PLANE IRON CAP MUST NOT BE DRAGGED ACROSS THE CUTTING EDGE

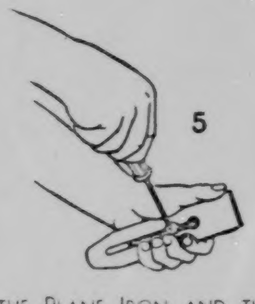


THE PLANE IRON CAP SHOULD EXTEND 1/16" BACK OF THE CUTTING EDGE FOR GENERAL WORK. ON CROSS GRAINED OR CURLY WOOD IT SHOULD BE AS NEAR TO THE CUTTING EDGE AS POSSIBLE

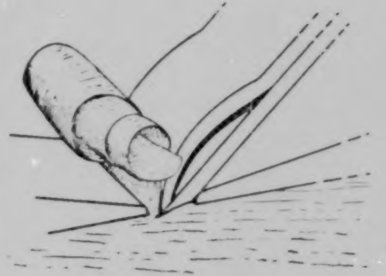

PLANE IRON OR BLADE
PLANE IRON CAP
SLOT FOR LATERAL ADJUSTMENT
CUTTING EDGE
SLOT FOR "Y" ADJUSTMENT
CAP IRON SCREW
SLOT FOR LEVER CAP SCREW
BEVEL


POORLY FITTED
PROPERLY FITTED

EDGE OF PLANE IRON CAP MUST FIT TIGHT TO PREVENT SHAVINGS WEDGING UNDER IT, PILING UP AND CHOKING THE PLANE



5–HOLD THE PLANE IRON AND THE PLANE IRON CAP FIRMLY AND TIGHTEN THE SCREW TO HOLD THE TWO PARTS TOGETHER



THE PLANE IRON CAP BREAKS AND CURLS THE SHAVING. TOGETHER WITH THE TOE OF THE PLANE IT PREVENTS THE WOOD SPLITTING AHEAD OF THE CUTTING EDGE, PRODUCING A SMOOTH SURFACE. THE PLANE IRON CAP ALSO SERVES TO STIFFEN THE PLANE IRON

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CHART NO. 12 ✓
BY R. C. REGER

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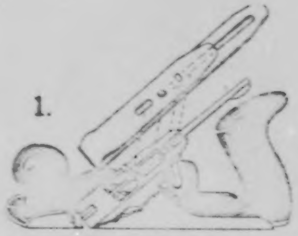
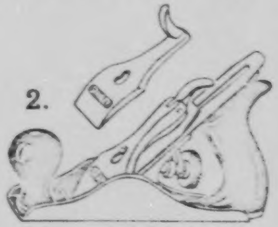
HOW TO SET THE
STANLEY PLANE

1.



TO PUT THE PLANE TOGETHER LAY THE PLANE IRON, BEVEL SIDE DOWN ON THE FROG. BE SURE THE ROLLER, ON THE LATERAL ADJUSTING LEVER, THE END OF THE "Y" ADJUSTING LEVER AND THE HEAD OF THE PLANE IRON CAP SCREW ARE CORRECTLY SEATED.

2.



SLIP THE LEVER CAP UNDER THE LEVER CAP SCREW AND PRESS DOWN THE CAM. IF THE PLANE IRON IS IN THE CORRECT POSITION THE CAM WILL EASILY SNAP IN PLACE. IF THE CAM WILL WILL NOT SNAP IN PLACE EASILY, SLIGHTLY LOOSEN THE LEVER CAP SCREW.

IF THE PLANE IRON, IS NOT FIRMLY HELD WHEN THE CAM IS IN PLACE SLIGHTLY TIGHTEN THE LEVER CAP SCREW.

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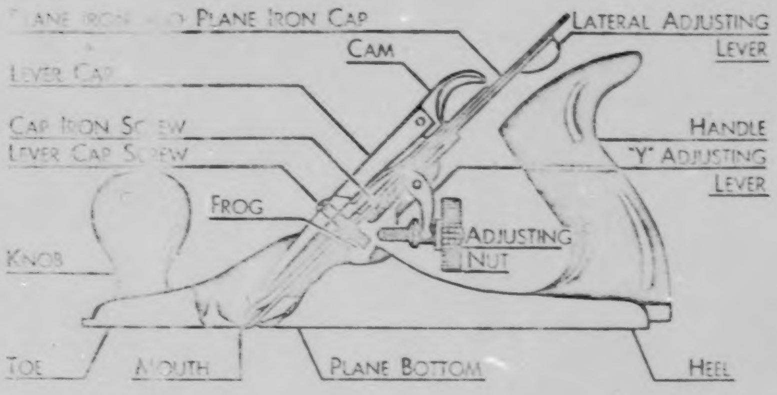
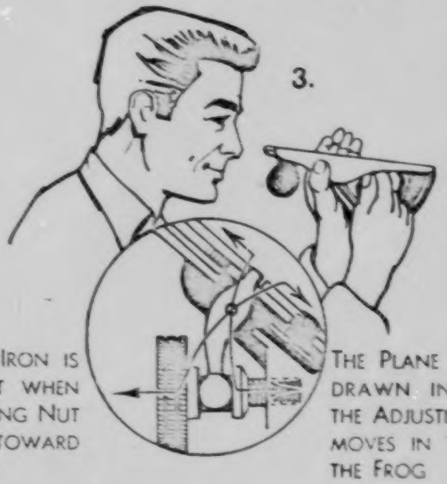

PLANE IRON AND PLANE IRON CAP
CAM
LEVER CAP
CAP IRON SCREW
LEVER CAP SCREW
FROG
KNOB
LATERAL ADJUSTING LEVER
HANDLE
"Y" ADJUSTING LEVER
ADJUSTING NUT
TOE
MOUTH
PLANE BOTTOM
HEEL

TO ADJUST FOR THE THICKNESS OF THE SHAVING SIGHT ALONG THE BOTTOM OF THE PLANE AND TURN THE ADJUSTING NUT UNTIL THE CUTTING EDGE PROJECTS ABOUT THE THICKNESS OF A HAIR.

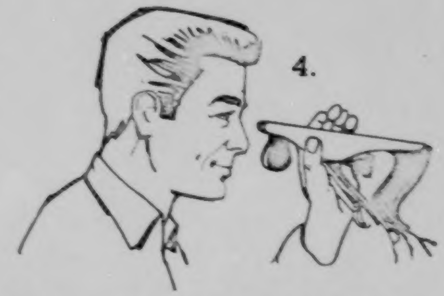
3.



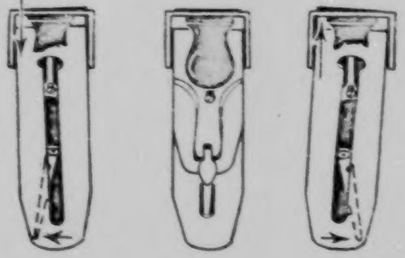
THE PLANE IRON IS PUSHED OUT WHEN THE ADJUSTING NUT MOVES OUT TOWARD THE HANDLE.

THE PLANE IRON IS DRAWN IN WHEN THE ADJUSTING NUT MOVES IN TOWARD THE FROG.

4.



TO ADJUST FOR THE EVENNESS OF THE SHAVING SIGHT ALONG THE BOTTOM OF THE PLANE AND MOVE THE LATERAL ADJUSTING LEVER TOWARD THE RIGHT OR THE LEFT.



KNOB, LEVER CAP AND PLANE IRON CAP REMOVED TO SHOW THE ACTION OF THE LATERAL ADJUSTING LEVER.

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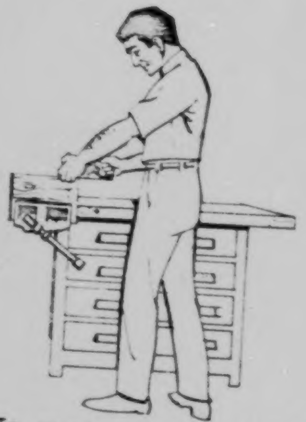
7

C-I-10

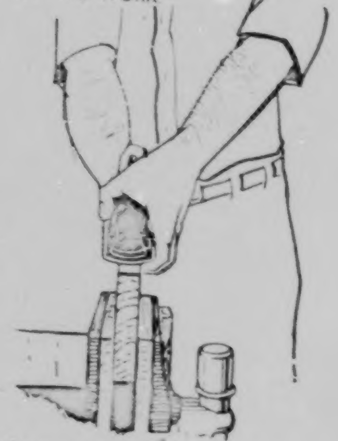
STANLEY

HOW TO USE THE
STANLEY PLANE

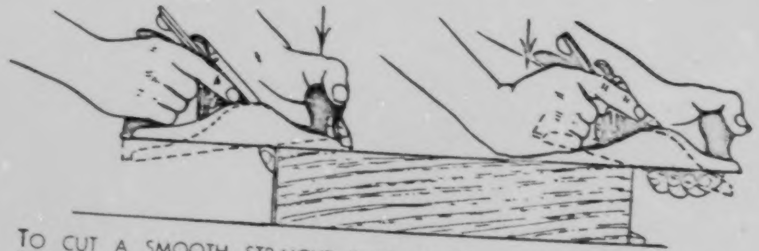
STANLEY



TO START PLANING TAKE AN EASY BUT FIRM POSITION DIRECTLY BACK OF THE WORK

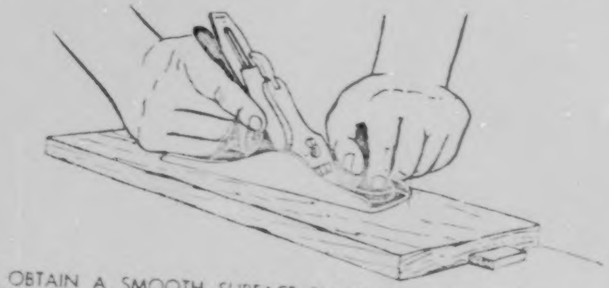


HOLD THE PLANE SQUARE WITH THE WORK FACE OF THE WORK

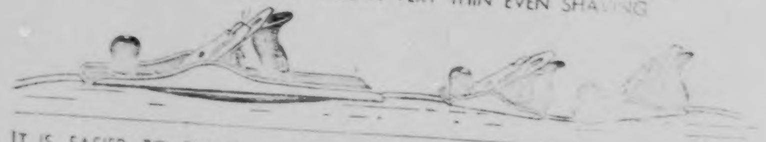


TO CUT A SMOOTH STRAIGHT EDGE THE PLANE IS PUSHED WITH THE GRAIN THAT IS IN THE UP HILL DIRECTION OF THE FIBRES

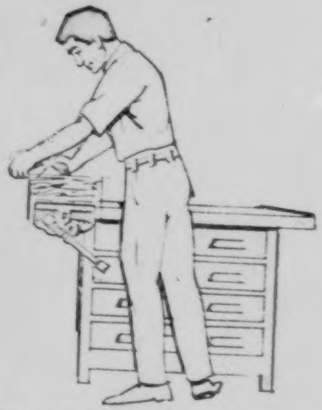
TO KEEP THE PLANE STRAIGHT PRESS DOWN ON THE KNOB AT THE BEGINNING OF THE STROKE AND ON THE HANDLE AT THE END OF THE STROKE AVOID DROPPING THE PLANE AS SHOWN BY THE BROKEN LINES IT ROUNDS THE CORNERS.



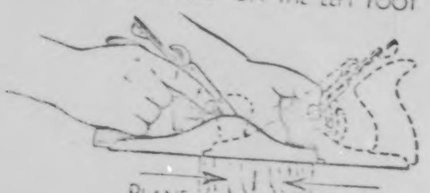
TO OBTAIN A SMOOTH SURFACE PLANE WITH THE GRAIN IF THE GRAIN IS TORN OR ROUGH AFTER THE FIRST STROKE REVERSE THE WORK. IF THE GRAIN IS CROSS OR CURLY, SHARPEN THE PLANE IRON CAREFULLY, SET THE PLANE IRON CAP AS NEAR THE CUTTING EDGE AS POSSIBLE AND ADJUST THE PLANE IRON TO TAKE A VERY THIN EVEN SHAVING



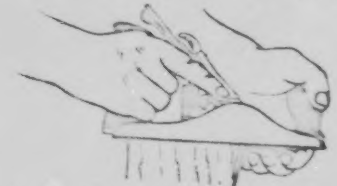
IT IS EASIER TO PLANE A LONG EDGE STRAIGHT WITH A LONG PLANE THAN WITH A SHORT ONE. A LONG PLANE BRIDGES THE LOW PARTS AND DOES NOT CUT THEM UNTIL THE HIGH SPOTS ARE REMOVED.



AT THE END OF THE STROKE THE WEIGHT OF THE BODY SHOULD BE CARRIED EASILY ON THE LEFT FOOT



PLANE END GRAIN HALF WAY FROM EACH EDGE



IF THE PLANE IS PUSHED ALL THE WAY THE CORNERS WILL BREAK.

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CHART NO. 14

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C-I-10

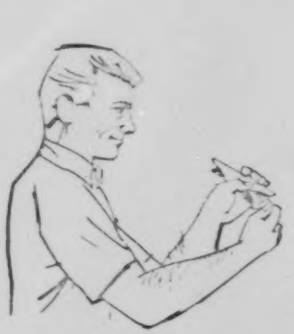
8

STANLEY

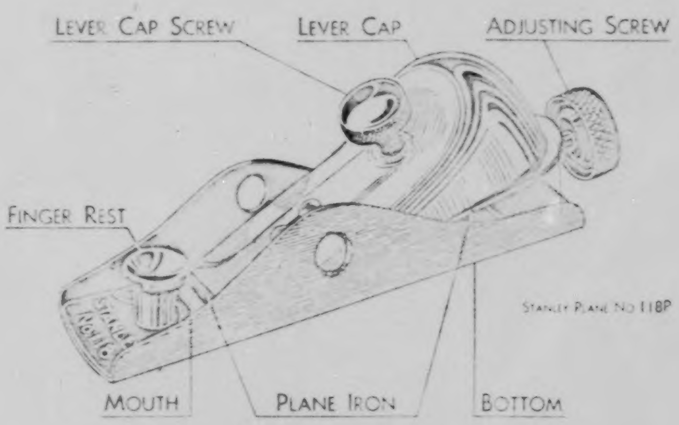
STANLEY

HOW TO ADJUST AND USE

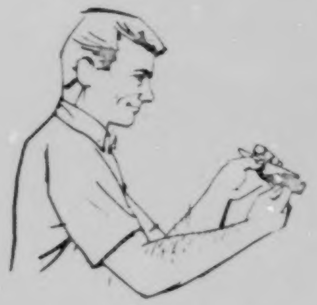
THE STANLEY BLOCK PLANE



TO ADJUST THE PLANE IRON VERTICALLY FOR THE THICKNESS OF THE SHAVINGS, SIGHT ALONG THE PLANE BOTTOM AND TURN THE ADJUSTING SCREW FORWARD TO PUSH THE PLANE IRON OUT, OR TURN IT BACK TO PULL THE PLANE IRON IN



STANLEY PLANE NO 118P

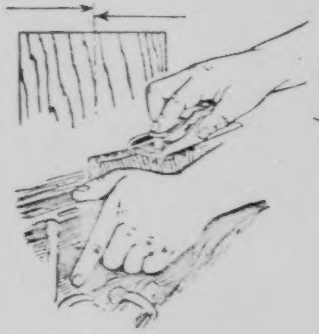


TO ADJUST THE PLANE IRON LATERALLY FOR EVENNESS OF SHAVINGS, LOOSEN THE LEVER CAP SCREW, SIGHT ALONG THE PLANE BOTTOM, PRESS THE PLANE IRON TO THE RIGHT OR TO THE LEFT AND TIGHTEN THE LEVER CAP SCREW

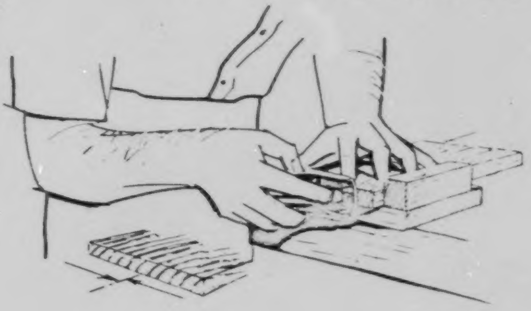
KEEP YOUR PLANE SHARP

SEE STANLEY CHARTS NO. C10 AND NO. C11 FOR GRINDING AND WHETTING PLANE IRONS. THE SAME APPLIES TO CHISELS

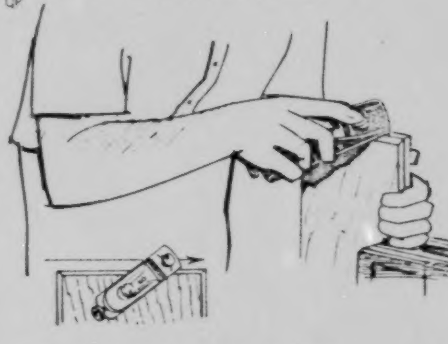
THE BLOCK PLANE HAS A SINGLE PLANE IRON SET AT A LOWER ANGLE THAN THE PLANE IRON OF THE SMOOTH PLANE, ENABLING IT TO CUT END GRAIN BETTER THAN OTHER PLANES. BECAUSE OF THE LOW ANGLE, THE PLANE IRON IS SET BEVEL UP



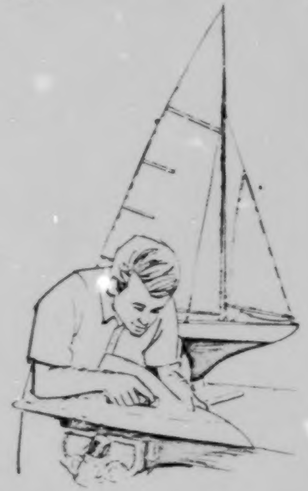
THE BLOCK PLANE IS USED TO PLANE SMALL PIECES AND TO PLANE THE ENDS OF MOULDINGS, TRIM AND SIDING



THE BLOCK PLANE IS A TOOL USED IN ONE HAND. THIS MAKES IT EASY TO USE WHEN THE WORK CANNOT BE TAKEN TO A VISE



THE BLOCK PLANE IS THE HANDIEST TOOL FOR PLANING CORNERS AND CHAMFERS ON SMALL PIECES OF WOOD



THE BLOCK PLANE IS INDISPENSABLE IN SHAPING HULLS AND SPARS OF MODEL BOATS AND THE PARTS OF MODEL AIRPLANES

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UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE 11: "CARPENTER'S" HATCHET

PREREQUISITES: UNIT I, TASK PACKAGES 1,2,3

RATIONALE:

Occasionally the carpenter finds it necessary to be able to use the hatchet to remove large amounts of wood in a short period of time where neither extreme accuracy nor the smoothness of the cut are factors to be considered. Examples of the use of this tool are: chopping ceiling joists to conform to rafter angles, removing excess material from the sill for the front door, cutting the edges of floor joists, and trimming stakes to be used in foundation layout work. Since the cutting and chopping of stakes involve procedures common to all chopping jobs, you will be expected to produce an acceptable stake. Continue this task package by reading the Objective and performing the Learning Activity and Learning Practice. Refer back to the objective if you should lose sight of your goal. Using a hatchet puts you in good company. Remember George Washington?

OBJECTIVE:

Upon completion of this task package you will be able to use the carpenter's hatchet for cutting and chopping stakes in conformity with a model stake provided by the instructor.

LEARNING ACTIVITY:

1. View slide-sound package C-I-11.
2. Read Modern Carpentry, page 15, concerning hatchets and also scan Unit 10 to see a hatchet in use.
3. Read Fundamentals of Carpentry, Volume 1, page 33, concerning hatchets.
4. This completes your Learning Activity - proceed now to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Carpenter's hatchet
2. Piece of stock
3. Folding wood rule
4. Combination square
5. T-bevel
6. Scrap piece of wood

1. Lay out your stake to the size of the model provided by the instructor. Use the tools provided to mark the stake.

LEARNING PRACTICE (cont'd):

2. Place the wood scrap on the work table and clamp it down.
3. Holding the stake in the manner shown in figure 1 and resting it on the scrap stock, proceed to chop the stake as follows:
   a. Set the piece of wood on its edge and make a series of small closely spaced cuts at an angle of about 45° across the grain and near the line.
   b. Cut away the notched compartments by striking with the grain along the line.
   c. In making the scoring cuts, when the grain is irregular, change the direction of the blow to cut across the grain with every stroke.

Note - The hatchet is used mostly to hew to a line with the grain.

4. Chop both sides of the stake in the manner outlined in step #3.
5. Compare your finished stake with the model provided by the instructor. If you did not do the job in an acceptable manner, you may want to repeat it again.
6. When you are satisfied with your work, turn it in to your instructor for his evaluation. You will either be directed to begin work on the next task package or to follow some other course of action.
7. Proceed at your own pace - Abe Lincoln did.

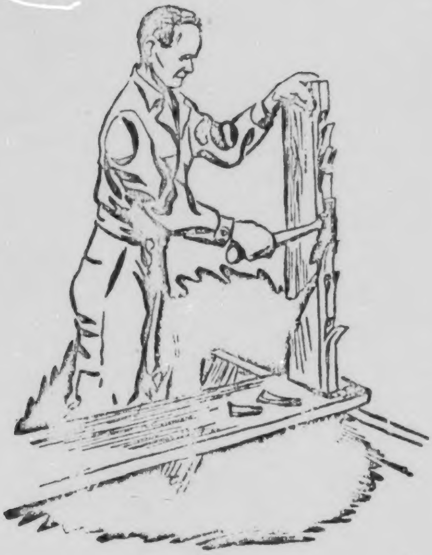


Figure 1

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE #12: WOOD CHISELS

PREREQUISITES: UNIT I, TASK PACKAGES 1, 3, and 11

RATIONALE:

The carpenter finds many and varied uses for his wood chisels. They may be used in the construction of many of the wood joints he uses, but probably the most common use is that of cutting out mortices in a door for the installation of the butt hinges. Chisels, in order to cut properly, must be kept sharp; however, they must be handled with extreme care so as not to harm yourself or a fellow student. Don't let what is happening in Figure 1, page 4 happen to you. OK? In doing the work outlined in this package you will gain considerable skill in the proper use of the wood chisel by being required to cut out a mortice in a piece of stock. In completing this task package, continue by reading the objective and doing the Learning Activity and Learning Practice. As you know, the objective sets forth your goal so you may refer back to it as often as you feel necessary. Make the chisel work for you smoothly and efficiently.

OBJECTIVE:

Upon completion of this task package you will be able to care for and use wood chisels on stock to remove material to a specified depth ± 1/32", leaving an even guideline showing, and without splintering the stock.

LEARNING ACTIVITY:

1. View sound-slide package #C-I-12.
2. Read Modern Carpentry about chisels, beginning at the bottom of page 13, the first column. Read, also material on the care and maintenance of edge cutting tools, pages 20, 21, and to top of page 22.
3. Study carefully the attached charts #17 and #18 concerning horizontal and vertical chiseling. Note that in all cases the hands are kept behind the cutting edge.
4. This completes your Learning Activity; begin, now, your work on the Learning Practice.

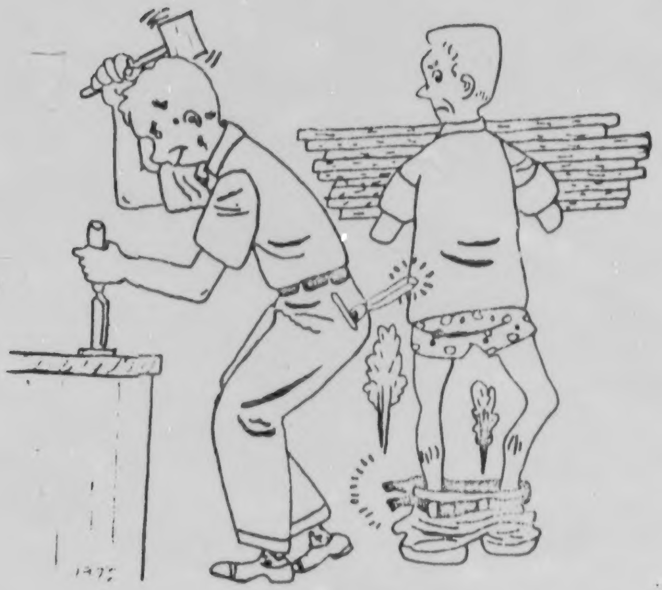
LEARNING PRACTICE:

Tools & Equipment

1. Wood chisel
2. Mallet or hammer
3. Combination square
4. Piece of 3/4" stock

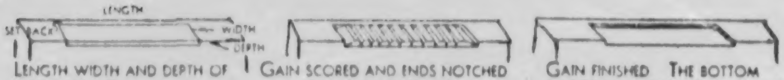
LEARNING PRACTICE (cont'd):

1. On the piece of stock, lay out an area which is 1 1/2" wide, 4" long, and 1/8" deep. Refer to figure #2; the illustration at the extreme left shows such a layout. Begin this process by starting approximately in the center of the stock, measuring from one edge, laying off a 1 1/2" line on the face of the wood. Next, measure a length of 4" on the face and, with the combination square, square lines through these joints. Finally, measure a depth of 1/8" from the same face along the edge.
2. Clamp the stock on a laboratory table top and proceed to cut out the mortice (or "gain" as it is called here). Note - Make sure in doing this job the proper use of the chisel is followed. Check charts 17 and 18 to refresh your memory.
3. Check your work to make sure you have removed the stock to the specified depth of ± 1/32", you left an even guideline showing, and the material was not splintered out.
4. If your job did not comply with the standards in #4, perhaps you had better lay out the same size mortice on the other side of the stock and begin the chiseling exercise again.
5. When you feel that you have met the objective, turn in your work to your instructor for his evaluation.
6. He will indicate what you should do next.
7. If he says, "Go to the next task package," great! You can be proud of your competency.



POCKETS AREN'T THE PLACE FOR TOOLS.
DON'T DISREGARD THE SAFETY RULES!

Figure 1


LENGTH
SET BACK
WIDTH
DEPTH

LENGTH WIDTH AND DEPTH OF GAIN LAID OFF

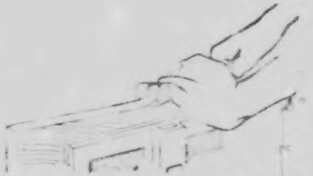
GAIN SCORED AND ENDS NOTCHED TO AID IN CHISELING

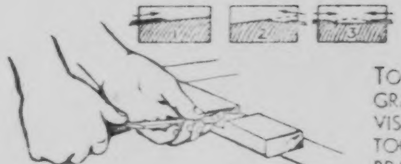
GAIN FINISHED THE BOTTOM SMOOTHED BY PARING WITH CHISEL

Figure 2

HOW TO USE
THE STANLEY CHISEL
HORIZONTAL CHISELING

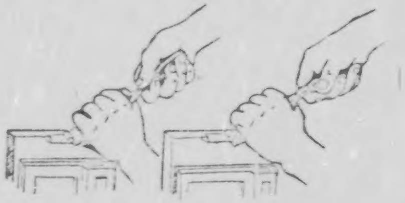
TO CUT HORIZONTALLY WITH THE GRAIN THE CHISEL IS HELD SLIGHTLY TURNED TO ONE SIDE AND THEN PUSHED FROM THE WORKER. IT IS HELD WITH THE BEVEL DOWN FOR A ROUGHING CUT AND WITH THE BEVEL UP FOR A PARING CUT



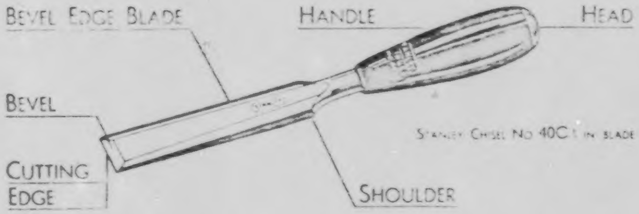


KEEP YOUR CHISEL SHARP

See Stanley Charts No. 10 and No. 11 for grinding and whetting Plane Irons. The same applies to Chisels.



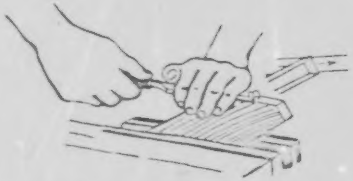
TO CUT A CHAMFER HOLD THE CHISEL INCLINED TO ONE SIDE PARALLEL TO THE SLOPE OF THE CHAMFER AND CUT AS IN CHISELING HORIZONTALLY WITH THE GRAIN



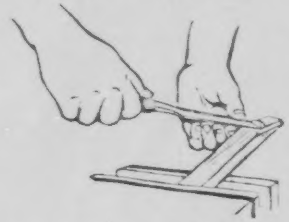
STANLEY CHISEL NO 40C 1 IN. BLADE

THE CHISEL IS CONTROLLED WITH THE LEFT HAND PRESSING FIRMLY ON THE CHISEL AND THE WOOD. THE POWER IS APPLIED WITH THE RIGHT HAND. THE CHISEL IS HELD SLIGHTLY TURNED SO THE EDGE SLIDES ACROSS THE WORK OR THE CHISEL IS MOVED TO THE RIGHT AND LEFT AS IT IS ADVANCED, TO GIVE A SLIDING ACTION TO THE CUTTING EDGE. THIS IS EASIER THAN A STRAIGHT THRUST AND LEAVES A SMOOTHER SURFACE ON THE WORK

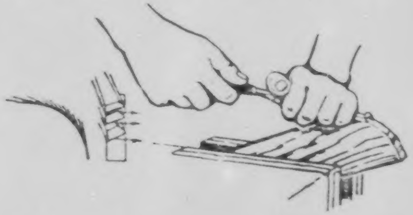
AT ALL TIMES KEEP BOTH HANDS BACK OF THE CUTTING EDGE.



TO CUT A STRAIGHT, SLANTING, CORNER IS THE SAME AS HORIZONTAL CHISELING. THE WORK IS HELD IN THE VISE WITH THE GUIDE LINE HORIZONTAL



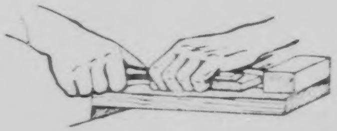
TO CUT A CHAMFER ON END GRAIN, THE CHISEL IS MOVED SIDEWAYS ACROSS THE CORNER OF THE WORK, HELD SO THAT THE CHISEL MAKES A SLIDING HORIZONTAL CUT



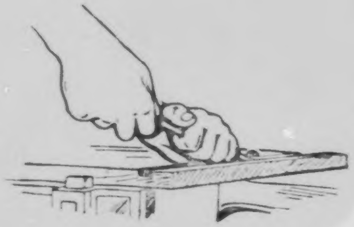
TO CUT A ROUND CORNER THE CHISEL IS MOVED SIDEWAYS ACROSS THE THE WORK MAKING A SERIES OF CUTS CLOSE TOGETHER EACH ONE TANGENT TO THE CURVE

TO CUT, HORIZONTALLY, ACROSS THE GRAIN WITH THE WORK HELD IN THE VISE PRESS THE FOREFINGER AND THUMB TOGETHER ON THE CHISEL TO ACT AS A BRAKE

TO AVOID SPLINTERING THE CORNERS, CUT HALF WAY FROM EACH EDGE TOWARD THE CENTER. REMOVE THE CENTER STOCK LAST



TO CUT ACROSS THE GRAIN WITH THE WORK HELD AGAINST THE BENCH HOOK, THE HEEL OF THE LEFT HAND STEADIES THE WORK WHILE THE FINGERS PRESS THE CHISEL FIRMLY AGAINST THE WOOD



IF THE WORK IS WIDE THE CHISEL IS HELD BEVEL DOWN, SO THE HANDLE WILL CLEAR THE WORK AND THE BLADE WILL NOT DIG IN TOO DEEP, AS IT IS PUSHED FORWARD

STANLEY TOOLS
NEW BRITAIN CONN USA

EDUCATIONAL DEPARTMENT
CHART NO 17

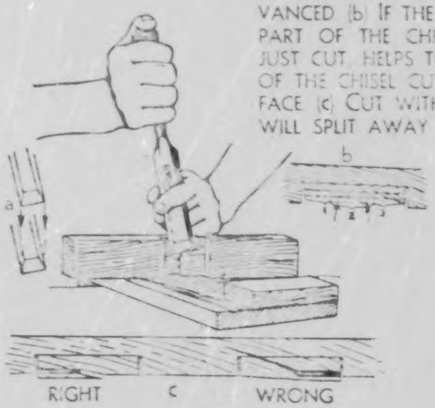
PRINTED IN U.S.A.

HOW TO USE

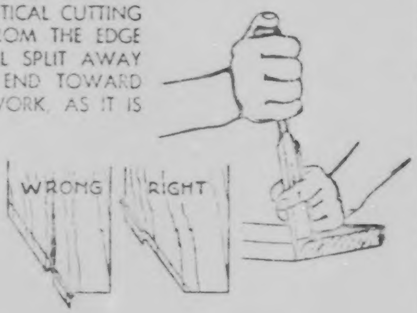
THE STANLEY CHISEL

VERTICAL CHISELING

TO CUT, VERTICALLY, ACROSS THE GRAIN (a) THE CHISEL SHOULD BE SLIGHTLY TILTED TO ONE SIDE TO GIVE A SLIDING ACTION TO THE CUTTING EDGE, OR IT MAY BE HELD STRAIGHT AND MOVED TO ONE SIDE AS IT IS ADVANCED (b) IF THE SURFACE IS WIDER THAN THE CHISEL, PART OF THE CHISEL PRESSED AGAINST THE PORTION JUST CUT, HELPS TO GUIDE AND KEEP IN LINE THE PART OF THE CHISEL CUTTING A NEW PORTION OF THE SURFACE (c) CUT WITH THE GRAIN, SO THE WASTE WOOD WILL SPLIT AWAY FROM THE GUIDE LINE

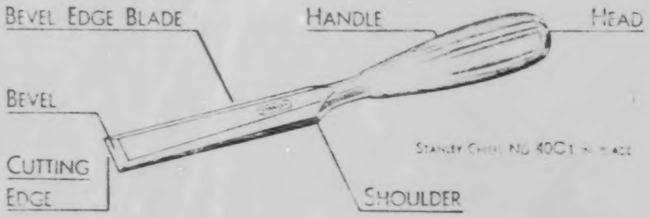


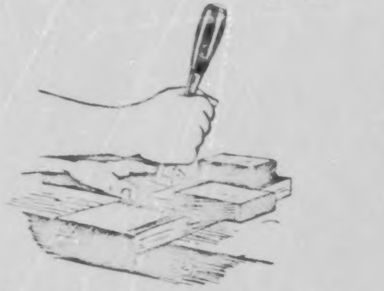
TO CUT, VERTICALLY, A SLANTING CORNER USE THE CHISEL IN THE SAME MANNER AS IN VERTICAL CUTTING ACROSS THE GRAIN. ALWAYS WORK FROM THE EDGE TOWARD THE END, SO THE WOOD WILL SPLIT AWAY FROM THE LINE. WORKING FROM THE END TOWARD THE EDGE WILL SPLIT AND RUIN THE WORK, AS IT IS CUTTING AGAINST THE GRAIN



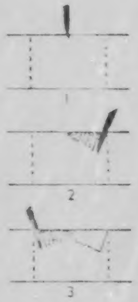
KEEP YOUR CHISEL SHARP

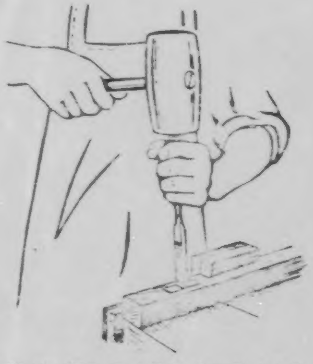
SEE STANLEY CHARTS NO. C10 AND NO. C11 FOR GRINDING AND WHETTING PLANE IRONS. THE SAME APPLIES TO CHISELS

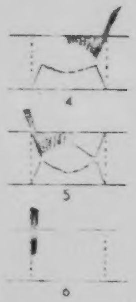




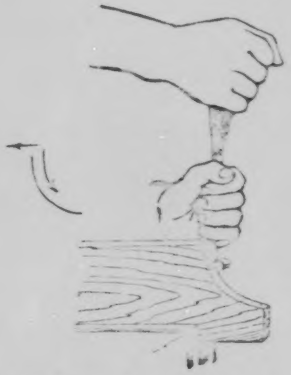
TO CLEAN THE CORNERS OF A TENON, NOTCH, DADO OR RABBET: GRASP THE CHISEL BY THE BLADE, NEAR THE EDGE, RAISE ONE CORNER OF THE CUTTING EDGE BY TILTING THE HANDLE AWAY AND DRAW THE CHISEL TOWARD YOU. THE WORK IS HELD BY THE LEFT HAND WHILE THE CHISEL EDGE AND ONE CORNER, GUIDED BY THE RIGHT HAND, ACT LIKE A KNIFE







THE MALLET MAY BE SAFELY USED ON THE CHISEL WHEN THE CUTTING EDGE IS ACROSS THE GRAIN. WHEN THE EDGE IS WITH THE GRAIN, THE USE OF THE MALLET IS VERY LIKELY TO SPLIT THE WOOD. THE MALLET MAY BE USED ON THE CHISEL TO BEAT OUT A MORTISE, TO CUT THE ENDS OF A MORTISE (WHEN THE BULK OF THE MATERIAL HAS BEEN BORED OUT), WHEN THE WOOD IS HARD AND IN ROUGHING OUT (WHEN THERE IS A LARGE AMOUNT OF MATERIAL TO BE REMOVED).



TO CUT A CONCAVE CURVED CORNER: HOLD THE BEVEL SIDE OF THE CHISEL AGAINST THE WORK WITH THE LEFT HAND; WITH THE RIGHT HAND PRESS DOWN AND DRAW BACK AT THE SAME TIME, GIVING A SWEEPING CURVED DIRECTION TO THE CUT.
ALWAYS WORK WITH THE GRAIN FROM THE EDGE TOWARD THE END.

STANLEY TOOLS
NEW BRITAIN, CONN., U.S.A.

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EDUCATIONAL DEPARTMENT
CHART NO. 18
BY R. D. REGER

PRINTED IN USA

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE 13: BRACE AND BITS

PREREQUISITES: UNIT I, TASK PACKAGE 1

RATIONALE:

The cutting operations performed on wood may be done by a variety of tools. If asked to mention cutting tools you might give the saws and chisels as examples. There are, however, other tools that may be listed; chief among them are the various kinds of bits. There are many times on the job that the carpenter finds it necessary to use the brace and auger bits or the expansive bits. In this task package you will learn how to use these tools properly. Now, in completing this task package, you should continue by reading the Objective (which states your goal) and doing the Learning Activity and Learning Practice. Brace yourself and study carpentry bit by bit.

OBJECTIVE:

Upon completion of this task package you will be able to use the brace for boring holes with auger and expansive bits in stock so that the hole will be of the correct size and position, square to the surface ± 2°, and without splinters on the back of the stock.

LEARNING ACTIVITY:

1. View slide sound package #C-I-13.
2. Read Modern Carpentry, the section on Drilling and Boring, pages 13, 14 and down to Fastening Parts Together on page 15. Study carefully the parts of the auger bit and the parts of the brace.
3. Read Fundamentals of Carpentry, Volume 1, on Boring tools, pages 24 and 25. Study the pictures of the expansive bit on page 26 and the brace on page 27.
4. Study carefully the two attached charts #23 and #26, paying particular attention to the auger bit, the expansive bit and the brace. In a short paper write the answers to the following questions. Retain this paper, which will be turned in to your instructor later.

LEARNING ACTIVITY (cont'd):

a. How are auger bits sized? Explain the numbering system.

b. How would you go about measuring the size of an auger bit if the size were not given on the bit?

c. How would you go about adjusting the expansive bit to a given size?

5. This completes your Learning Activity; proceed now to the Learning Practice.

LEARNING PRACTICE:

1. Turn in the paper you prepared in the Learning Activity. Your instructor will evaluate your work and if acceptable direct you to #2 of the Learning Practice.
2. You will be issued a piece of 3/4" scrap stock, a brace, an expansive bit, and a set of auger bits.
3. On the face of your piece of stock, lay out centers to bore four holes. (Each of these centers should be 2" from an end of the stock and 2" from an edge. Mark these positions by using a penciled "+" mark.)
4. Select a 1/2" auger bit to use in boring the first hole. Insert the bit into the brace and tighten it in place as shown on chart #26.

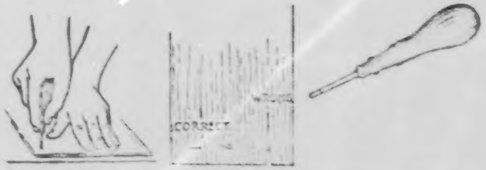
LEARNING PRACTICE (cont'd):

5. Clamp your stock into place and proceed to bore the 1/2" hole (any of the four locations is acceptable), making sure to start the feed screw of the bit exactly on one of the "+" marks. Check your boring angle with a square as pictured on chart #26. When the feed screw point comes through on the back side, remove the bit and finish the hole from the opposite side. See chart #26.
6. Using a 3/8" auger bit, bore another hole through the stock, starting at one of the "+" marks.
7. At the third "+" mark, bore a 3/4" hole.
8. Using an expansive bit, bore a 1 1/8" hole through the stock, beginning at the last "+" mark. * Be sure to check the adjusting and boring procedure as outlined on charts #23 and #26.
9. If you are satisfied that the standards, as set forth in the Objective, have been met, hand your work in to the instructor for his evaluation.
10. Upon his recommendation, proceed to the next task package.
11. Grin and bear it. Nothing lasts forever.

STANLEY

HOW TO USE BORING TOOLS

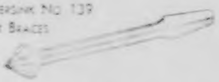
STANLEY



BRAD AWLS ARE USED TO MAKE HOLES FOR SMALL SCREWS AND NAILS. TO AVOID SPLITTING THE WOOD, START THE AWL WITH ITS EDGE ACROSS THE GRAIN, TURNING IT BACK AND FORTH SLIGHTLY AS YOU PRESS DOWN. DO NOT LET THE EDGE COME PARALLEL WITH THE GRAIN.

TWIST BITS FOR WOOD ARE USED TO MAKE HOLES FOR SCREWS, NAILS OR BOLTS. THEY ARE SIZED BY 32NDS OF AN INCH AND RANGE FROM NO. 2-1/16" AND LARGER.

BIT STOCK DRILLS ARE DESIGNED AND TEMPERED TO MAKE HOLES IN METAL, BUT MAY ALSO BE USED IN WOOD, ESPECIALLY IN REPAIR WORK WHERE CONTACT WITH NAILS OR METAL IS POSSIBLE. THEY ARE SIZED BY 32NDS OF AN INCH AND RANGE FROM NO. 2 - 1/16" AND LARGER.



STANLEY
COUNTERSINK NO. 139
FOR BIT BRACES

STANLEY
COUNTERSINK NO. [illegible]
[illegible]

COUNTERSINK BITS ARE USED TO WIDEN SCREW HOLES SO THAT THE HEADS OF FLAT-HEAD SCREWS MAY BE FLUSH OR SLIGHTLY BELOW THE SURFACE OF THE WORK.

FORSTNER BITS ARE USED TO BORE HOLES PART WAY THROUGH WHERE THE [illegible] HOLE [illegible] THROUGH THE WORK; ALSO FOR END [illegible] THIN WOOD OR NEAR AN END WHERE AN AUGER BIT WOULD SPLIT THE WORK. TO CENTER OR START A FORSTNER BIT, SCRIBE A CIRCLE THE SIZE OF THE HOLE WITH DIVIDERS AND PRESS THE RIM OF THE FORSTNER BIT INTO IT. FORSTNER BITS ARE SIZED BY 16THS OF AN INCH FROM NO. 4-1/4" AND LARGER.

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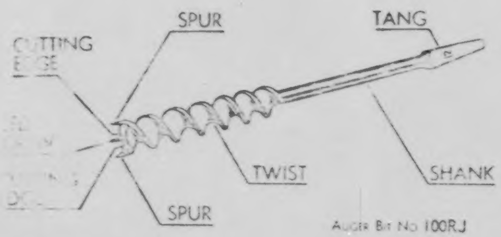
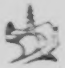


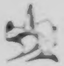
AUGER BIT NO. 100RJ

AUGER BITS ARE SIZED BY 16THS OF AN INCH, MEASURING THE DIAMETER. BITS VARY IN LENGTH FROM 7" TO 10".
DOWEL BITS ARE SHORT AUGER BITS ABOUT 5" LONG.

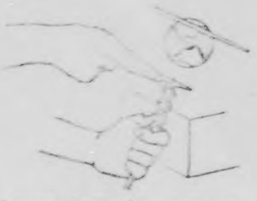
THE STANDARD DOUBLE THREAD FEED SCREW IS BEST FOR GENERAL WORK WITH SEASONED WOOD. IT IS PREFERRED FOR CABINET AND PATTERN MAKING.



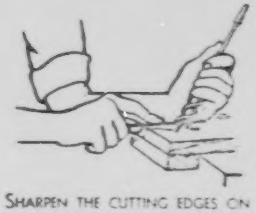
THE SINGLE THREAD FEED SCREW IS BEST FOR FAST CUTTING IN GREEN OR GUMMY WOOD.



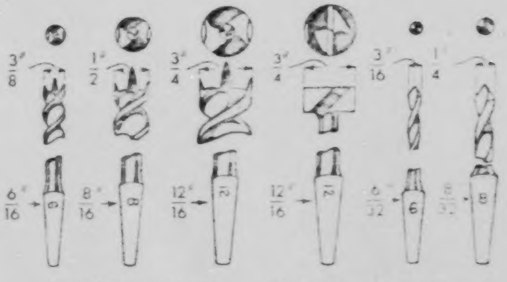
THE DIAMOND POINT IS USED FOR MACHINE BORING WITH POWER FEED.



SHARPEN AUGER BITS WITH A BIT FILE. FOR A KEEN EDGE, ALSO WHET WITH A SLIPSTONE. SHARPEN THE SPURS ON THE INSIDE TO PRESERVE THE DIAMETER.

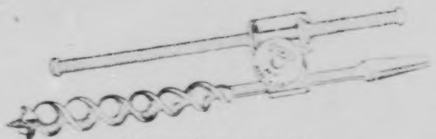


SHARPEN THE CUTTING EDGES ON THE TOP TO MAINTAIN THE CLEARANCE ON THE UNDER SIDE. THE CUTTING EDGES MUST BE KEPT EVEN.



AUGER BITS, 16THS OF AN INCH — FORSTNER BITS, 16THS — TWIST BITS, 32NDS OF AN INCH

BITS ARE MARKED FOR SIZE BY A SINGLE NUMBER. THE NUMERATOR OF THE FRACTION STANDS FOR THE DIAMETER OF THE BIT. AUGER AND FORSTNER BITS ARE MARKED BY 16THS OF AN INCH. NO. 8 STANDS FOR 8/16" OR 1/2". TWIST BITS FOR WOOD ARE USUALLY MARKED IN THE SAME WAY, BY 32NDS OF AN INCH. NO. 8 STANDS FOR 8/32" OR 1/4".



STANLEY BIT GAUGE NO. 47

AN ADJUSTABLE BIT GAUGE MAY BE USED TO REGULATE THE DEPTH OF HOLES.

EXPANSIVE BIT NO. 71 A

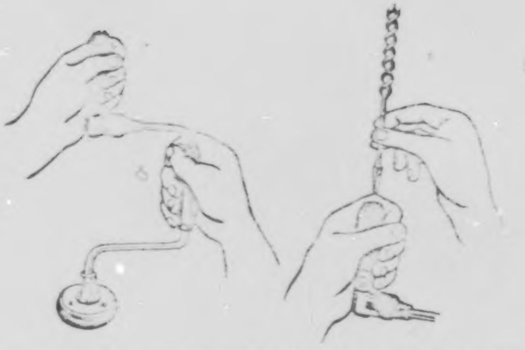
THE EXPANSIVE BIT TAKES THE PLACE OF MANY LARGE BITS. THE CUTTER MAY BE ADJUSTED FOR VARIOUS SIZED HOLES. MOVING THE CUTTER ADJUSTING SCREW ONE COMPLETE TURN ENLARGES OR REDUCES THE HOLE 1/8". ONE HALF TURN 1/16". TEST THE SIZE ON A PIECE OF WASTE WOOD. FOR BORING THROUGH, CLAMP A PIECE OF WASTE WOOD ON THE BACK OF THE WORK TO PREVENT SPLITTING.

EDUCATIONAL DEPARTMENT
CHART NO. 23

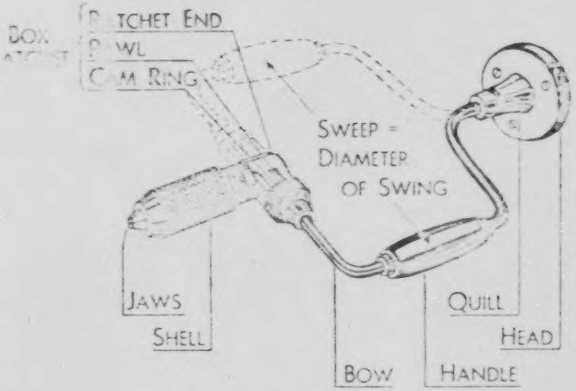
C-I-13

HOW TO USE

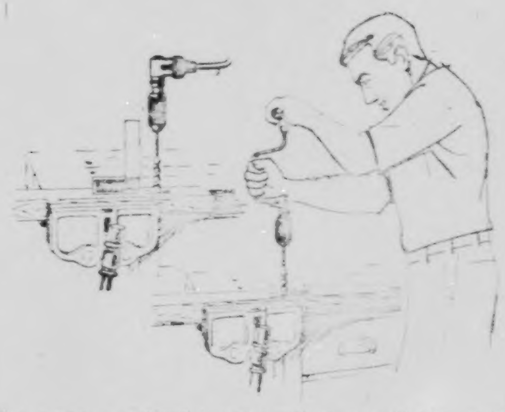
THE STANLEY BIT BRACE



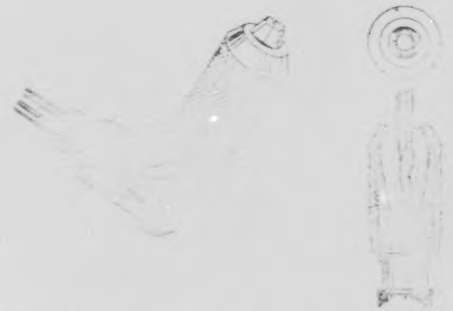
TO PLACE THE BIT IN THE CHUCK, GRASP THE CHUCK SHELL AND TURN THE HANDLE TO THE LEFT UNTIL THE JAWS ARE WIDE OPEN. INSERT THE BIT SHANK IN THE SQUARE SOCKET AT THE BOTTOM OF THE CHUCK AND TURN THE HANDLE TO THE RIGHT UNTIL THE BIT IS HELD FIRMLY IN THE JAWS.



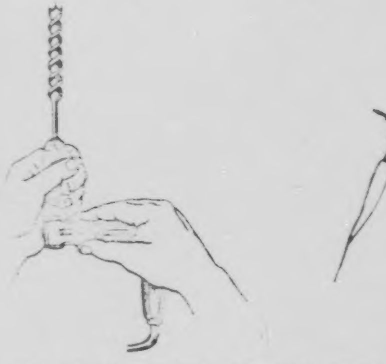
STANLEY RATCHET BIT BRACE No. 923-10 IN. SWEEP



TO BORE A VERTICLE HOLE, HOLD THE BRACE AND BIT PERPENDICULAR TO THE SURFACE OF THE WORK. TEST BY SIGHT. COMPARE THE DIRECTION OF THE BIT TO THE NEAREST STRAIGHT EDGE OR TO SIDES OF THE VISE. A TRY SQUARE MAY BE HELD NEAR THE BIT.

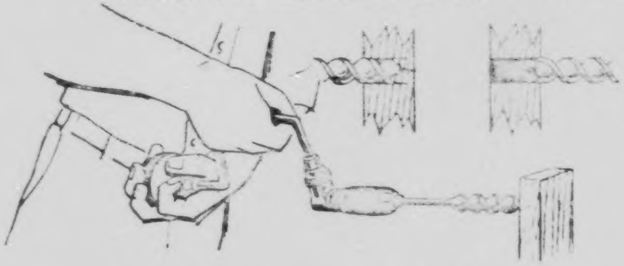


BIT BRACE CHUCKS OF THE ABOVE DESIGN, WITHOUT A SQUARE SOCKET, ARE OPERATED IN LIKE MANNER. THE CORNERS OF THE TAPER SHANK OF THE BIT SHOULD BE CAREFULLY SEATED AND CENTERED IN THE V GROOVES OF THE JAWS.



TO OPERATE THE RATCHET TURN THE CAM RING. TURNING THE CAM RING TO THE RIGHT WILL ALLOW THE BIT TO TURN RIGHT AND GIVE RATCHET ACTION WHEN THE HANDLE IS TURNED LEFT. TURN THE CAM RING LEFT TO REVERSE THE ACTION.

THE RATCHET BRACE IS INDISPENSABLE WHEN BORING A HOLE IN A CORNER OR WHERE SOME OBJECT PREVENTS MAKING A FULL TURN WITH THE HANDLE.



TO BORE A HORIZONTAL HOLE, HOLD THE HEAD OF THE BRACE CUPPED IN THE LEFT HAND AGAINST THE STOMACH AND WITH THE THUMB AND FOREFINGER AROUND THE QUILL. TO BORE THRU WITHOUT SPLINTERING THE SECOND FACE, STOP WHEN THE SCREW POINT IS THRU AND FINISH FROM THE SECOND FACE. WHEN BORING THRU WITH AN EXPANSIVE BIT IT IS BEST TO CLAMP A PIECE OF WOOD TO THE SECOND FACE AND BORE STRAIGHT THRU.

STANLEY TOOLS
NEW BRITAIN, CONN. U.S.A.

EDUCATIONAL DEPARTM
CHART NO. 2

UNIT I: CARPENTRY HAND TOOLS

TASK PACKAGE 14: STANDARD AND SPIRAL RATCHET SCREW DRIVERS

PREREQUISITES: UNIT I, TASK PACKAGES 1 AND 13

RATIONALE:

In his work the carpenter often finds it necessary to use screw drivers. Most people, at one time or another, have used a screw driver; however, they may not have used it correctly. How many times have you seen it abused by using it as a pry bar, as a can opener, as an ice pick, as a door stop, or as it is used in figure #1 by "Primitive Pete." The purpose of the task package is to instruct you on the proper utilization of the standard screw driver and the spiral ratchet screwdriver. In the completion of this task package [illegible] reading the Objective and doing the [illegible] activity and the Learning Practice, referring back to the [illegible] as often as necessary. You may become the best carpenter around if you really dig this course.

OBJECTIVE:

Upon completion of this task package you will be able to select and use a standard screwdriver and spiral ratchet (yankee) screwdriver so that the tip snugly fits the screw slot and the screw is driven in accordance with criteria established by the instructor.

LEARNING ACTIVITY:

1. View slide sound packages #C-I-14 and TT-1.
2. Read Modern Carpentry, columns 1 and 2, page 17, as it relates to screw drivers.
3. Read and study carefully the material about the standard and the spiral ratchet screwdriver shown on charts #21 and #22. Discuss with a fellow student how you would go about selecting the correct screwdriver for a given size screw. Explain to him how you would drive a screw to fasten two pieces of wood together.
4. This completes your Learning Activity; now begin your Learning Practice.

LEARNING PRACTICE:

Tools & Equipment

1. Several different sizes of the standard screwdriver
2. A spiral ratchet scewdriver with various size tips

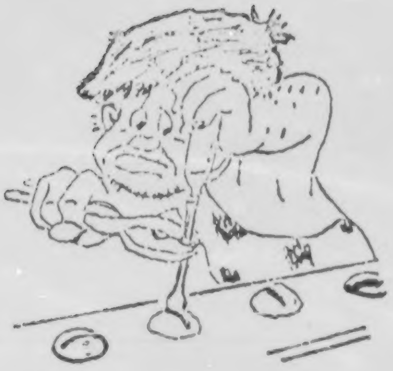
LEARNING PRACTICE (cont'd):

    3. An assortment of flat head wood screws
    4. Two pieces of 3/4" scrap wood
    5. A brace

1. You are to attach the two pieces of stock together by using three different sizes of flat head screws located at any point you desire.
2. Select and drill the proper size holes for each of the three screws in the top piece of wood (this is the 1st hole). See chart #21.
3. Drill the proper size hole in the second piece of wood (2nd hole). Refer to chart #21 again.
4. Countersink the three holes in the first piece of wood to match the diameter of the head of the screw being used. (See charts 21 and #22 for countersink shape). Use a brace to drive the countersink.
5. Select the proper size standard screwdriver and drive one screw into place. Make sure the head of the screw is seated properly and the wood around the head is not damaged.
6. Drive the second screw into place with the proper size standard screwdriver.
7. Drive the remaining screw into place, using the spiral ratchet screwdriver and the proper size screwdriver bit. (Refer to chart #22 for the proper procedure in using this type of screwdriver.)

LEARNING PRACTICE (cont'd):

8. When you have finished your work let the instructor evaluate it.
9. He will indicate to you what you should do next. If it is to proceed to the next task package, congratulations!
10. Oh, by the way, tools should always be put back in their proper place, not placed improperly as shown in figure #2.
11. Keep plugging - the end is in sight.



Don't

Figure 1

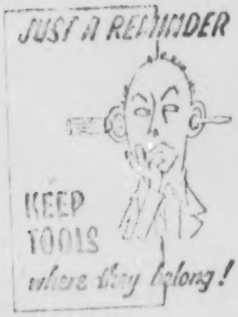
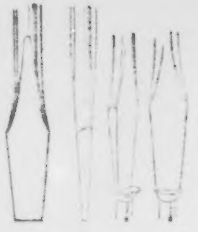

JUST A REMINDER
KEEP TOOLS
where they belong!

Figure 2

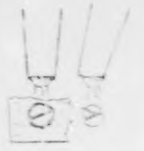
HOW TO USE

THE STANLEY SCREWDRIVER

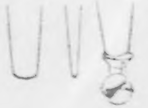
AND INFORMATION FOR DRIVING SCREWS



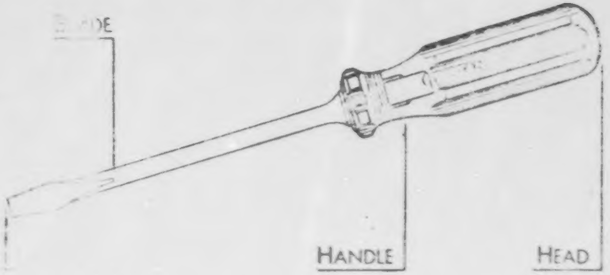
Select a screw driver of length and tip fitted to the work.
Screw drivers are specified by the length of the blade.
The tip should be straight and nearly parallel sided. It should fit the screw slot and be no wider than the screw head.



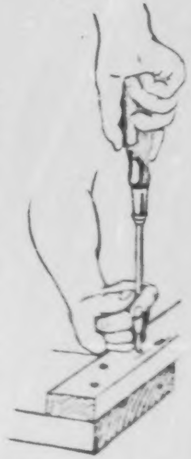
If the tip is too wide it will scar the wood around the screw head.
If the screw driver is not held in line with the screw it will slip out of the slot and mar both the screw and the work.



If the tip is rounded or, beveled it will raise out of the slot spoiling the screw head. Regrind or file the tip to make it as shown above.



Stanley Screw Driver No 1006 6 in. blade

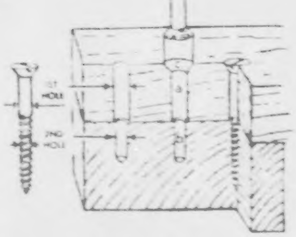


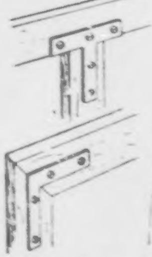
Use the longest screw driver convenient for the work. More power can be applied to a long screw driver than a short one, with less danger of its slipping out of the slot.
Hold the handle firmly in the palm of the right hand with the thumb and forefinger grasping the handle near the ferrule. With the left hand steady the tip and keep it pressed into the slot while renewing the grip on the handle for a new turn.

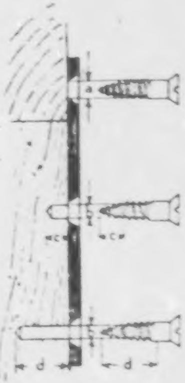
If no hole is bored for the threaded part of the screw the wood is often split or the screw is twisted off.
If a screw turns too hard, back it out and enlarge the hole.
A little soap on the threads of the screw makes it easier to drive.

To fasten two pieces of wood together with screws:

1. Locate the positions of the screw holes.
2. Bore the first hole slightly smaller than the threaded part of the screw through both pieces of wood as at b. Bore only as deep as three quarters the length of the screw.
3. Bore the second hole in the first piece of wood slightly larger than the diameter of the screw shank, as at a.
4. Countersink the first holes to match the diameter of the heads of the screws, as at c.
5. Drive the screws tightly in place with the screw drivers.



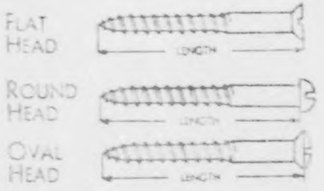




To fasten hinges or other hardware in place with screws

1. Locate the position of the piece of hardware on the work
2. Recess the work to receive the hardware, if it is necessary
3. Locate the positions of the screws
4. Select screws that will easily pass thru the holes in the hardware, as at a
5. Bore the pilot holes (second hole) slightly smaller than the diameter of the threaded part of the screws, as at b
6. Drive the screws tightly in place

If the wood is soft, bore as deep as half the length of the threaded part of the screw, as at c. If the wood is hard (oak), the screw soft (brass), or if the screw is large, the hole must be nearly as deep as the screw, as at d. Holes for small screws are usually made with brad awls.



Sizes of Bits or Drills to Bore Holes for Wood Screws

Number of Screw		1	2	3	4	5	6	7	8	9	10	12	14	16	18
Body Diameter of Screw		073	086	099	112	125	138	151	164	177	190	216	242	268	294
		$\frac{5''}{64}-$	$\frac{3''}{32}-$	$\frac{3''}{32}+$	$\frac{7''}{64}+$	$\frac{1''}{8}$	$\frac{9''}{64}-$	$\frac{5''}{32}-$	$\frac{11''}{64}-$	$\frac{11''}{64}+$	$\frac{3''}{16}+$	$\frac{7''}{32}-$	$\frac{15''}{64}+$	$\frac{17''}{64}+$	$\frac{19''}{64}-$
First Hole	Twist Drill Size	$\frac{5''}{64}$	$\frac{3''}{32}$	$\frac{7''}{64}$	$\frac{7''}{64}$	$\frac{1''}{8}$	$\frac{9''}{64}$	$\frac{5''}{32}$	$\frac{11''}{64}$	$\frac{3''}{16}$	$\frac{3''}{16}$	$\frac{7''}{32}$	$\frac{1''}{4}$	$\frac{17''}{64}$	$\frac{19''}{64}$
	Auger Bit Number							3	3	3	3	4	4	5	5
Second Hole	Twist Drill Size		$\frac{1''}{16}$	$\frac{1''}{16}$	$\frac{5''}{64}$	$\frac{5''}{64}$	$\frac{3''}{32}$	$\frac{7''}{64}$	$\frac{7''}{64}$	$\frac{1''}{8}$	$\frac{1''}{8}$	$\frac{9''}{64}$	$\frac{5''}{32}$	$\frac{3''}{16}$	$\frac{13''}{64}$
	Auger Bit Number												3	3	4

Exact sizes cannot be given for the holes for wood screws. The above are approximately right for average needs. Variations in hard and soft wood, moisture content and snug or loose fits, if desired, should be considered. Number and letter sizes of drills are available if more exact sizes are wanted. A trial fit in scrap wood is practical.

Determine Screw Shank Sizes by Comparison Below

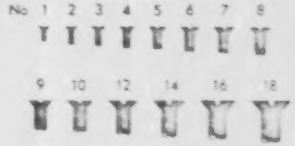


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CHART NO. 21

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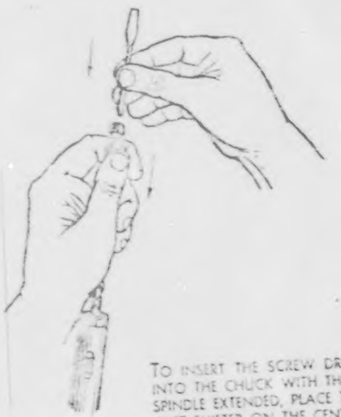
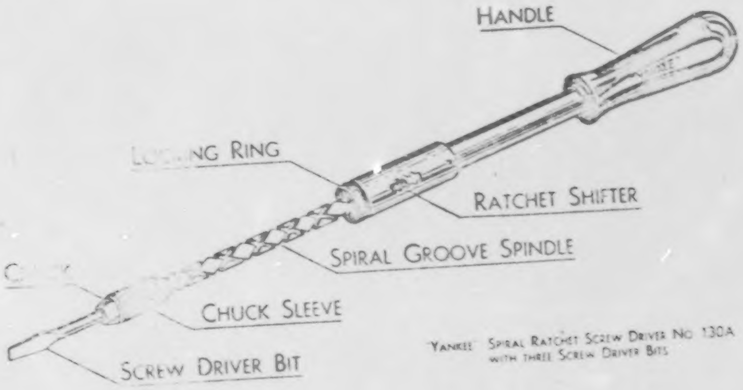
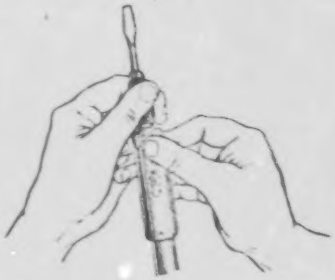
C-I-14

HOW TO USE
THE "YANKEE" SPIRAL RATCHET SCREWDRIVER



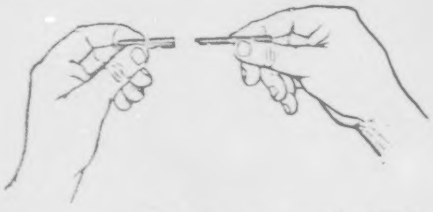


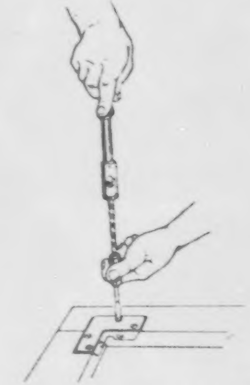
"YANKEE" SPIRAL RATCHET SCREW DRIVER NO 130A WITH THREE SCREW DRIVER BITS

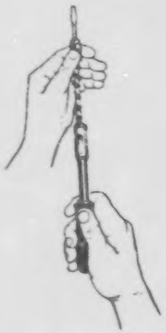


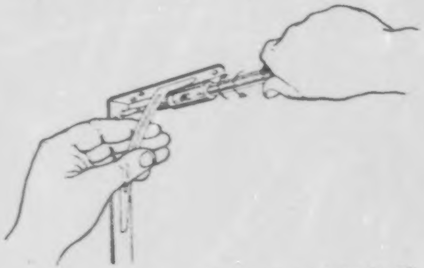
TO INSERT THE SCREW DRIVER BIT INTO THE CHUCK WITH THE SPIRAL SPINDLE EXTENDED, PLACE THE RATCHET SHIFTER ON THE CENTER POSITION PULL THE CHUCK SLEEVE DOWN INSERT THE BIT TURN THE BIT UNTIL YOU FEEL IT IS SEATED RELEASE THE CHUCK SLEEVE

TO USE AS A RATCHET SCREW DRIVER DRAW THE SPINDLE IN, THEN TURN THE LOCKING RING TO THE LEFT TO LOCK IT VARY THE SHIFTER POSITION TO CHANGE THE RATCHET ACTION TO RELEASE THE SPIRAL SPINDLE SAFELY, HOLD IT BY THE CHUCK WHILE TURNING THE LOCKING RING TO THE RIGHT, SO SPINDLE WILL NOT FLY OUT







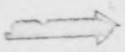


WITH THE DRILL POINTS AND CHUCK ADAPTOR THE SPIRAL RATCHET SCREW DRIVER BECOMES AN AUTOMATIC PUSH DRILL A DRILL POINT IS INSERTED INTO THE CHUCK ADAPTOR TURN THE DRILL POINT UNTIL YOU FEEL IT IS SEATED THE TWO ASSEMBLED PIECES ARE THEN PLACED IN THE CHUCK IN THE SAME MANNER AS A SCREW DRIVER BIT

THE YANKEE SPIRAL RATCHET SCREW DRIVER IS MOST USEFUL FOR THE RAPID DRIVING OR DRAWING OF SCREWS OR FOR USE IN AWKWARD PLACES IT IS ESPECIALLY PRACTICAL IN REPETITIVE PRODUCTION WORK IN INDUSTRY IT CAN BE STEADIED BY HOLDING THE REVOLVING CHUCK SLEEVE WITH THE FINGERS OF THE LEFT HAND.

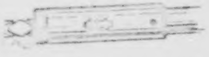
AS A RATCHET SCREW DRIVER, THE SCREW IS DRIVEN OR DRAWN BY TURNING THE HAND RIGHT AND LEFT THE LEFT HAND IS FREE TO HOLD THE WORK AFTER THE SCREW IS STARTED

DRILL POINT

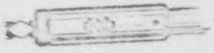


COUNTERSINK

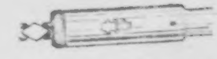
THERE ARE EIGHT DRILL POINTS, SIZES 1/16" TO 11/64" THE COUNTERSINK ALSO FITS INTO THE SCREW DRIVER CHUCK



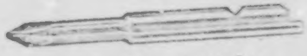
TO DRIVE SCREWS OR DRILL HOLES WITH QUICK RETURN SPIRAL RATCHET ACTION, SET THE RATCHET SHIFTER ON THE POSITION NEAREST TO THE CHUCK



TO USE AS A LONG RIGID SCREW DRIVER, WITHOUT SPIRAL OR RATCHET ACTION, SET THE RATCHET SHIFTER ON THE CENTER POSITION



TO DRAW SCREWS WITH QUICK RETURN SPIRAL RATCHET ACTION, SET THE RATCHET SHIFTER ON THE POSITION NEAREST THE HANDLE



PHILLIPS SCREW DRIVER BIT

THE PHILLIPS SCREW DRIVER BITS ARE ACCESSORIES THAT ADD TO THE USEFULNESS OF THIS TOOL

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CHART NO. 22
BY R O PEGER

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C-1-15

UNIT 1: CARPENTRY HAND TOOLS

TASK PACKAGE 15: HAMMERS

PREREQUISITES: UNIT I, TASK PACKAGE #1

RATIONALE:

Of all the tools the carpenter possesses, he probably uses his hammer more than anything else. The mark of a good carpenter is the effective and efficient use of his hammer. Have you ever watched the skill with which he drives nails and the confidence that he radiates as he uses this tool? He did not become proficient in its use overnight; it took many years of practice to become that skilled. But he started where you are starting, by driving nails. The hammer is not hard to use and it is believed that you can learn to use it skillfully. Ready to start? O. K., now continue with this task package by reading the Objective and doing the Learning Activity and Learning Practices, referring back to the Objective to see if you have reached your goal. Begin hammering away!

OBJECTIVE:

Upon completion of this task package you will be able to select and use hammers to drive head and headless nails straight and true, without damaging the surface of the stock, and to withdraw nails without marring the surface.

LEARNING ACTIVITY:

1. View sound-slide package #TT-6.
2. Read carefully Modern Carpentry, page 15, beginning at the section entitled Fastening Parts Together and ending when you have finished reading about hammers.
3. Read page 32 in Fundamentals of Carpentry, Volume 1, the section on the Hammer. Study the picture of the claw hammer on page 33, taking note of its parts.
4. Study carefully the attached chart #20 on How To Use The Nail Hammer.
5. This completes your Learning Activity; begin, now, on your Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Claw hammer
2. Assortment of head and headless nails

LEARNING PRACTICE (cont'd):

Tools and Equipment (cont'd)

3. Several pieces of scrap construction wood
4. Nail set

1. Place one piece of stock on the work bench and the 2nd piece directly over the 1st. (Any position is acceptable) (Note - if there is any danger that the nails will come through the 2nd piece, back-up this piece with another scrap piece of wood. Holes in the work bench are a no, no!)
2. Select a nail with a head from the assortment. Holding and using the claw hammer in the manner shown on chart #20, drive the nail through the first into the second piece of wood. Did you drive the nail straight and true so that the head is flush with the surface of the top piece of stock and without damaging the surface?
3. Let's try another head nail. Drive it using the same procedure. Check your quality of work. If not satisfied drive as many head nails as you feel necessary.
4. Next, drive a head nail only 3/4 of the way into the wood. Using the procedure illustrated on chart #20, pull the nail out of the stock. Did you use a scrap block in performing this operation?
5. Drive several headless nails into both pieces of wood, trying to

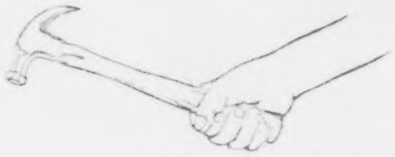
LEARNING PRACTICE (cont'd):

keep the nail straight without marring the surface of the wood. Set half of the headless nails below the surface of the top board using a nail set as pictured on chart #20.

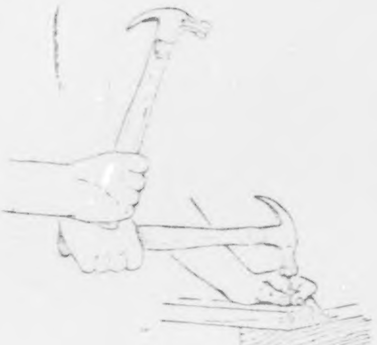
6. When you are satisfied with your accomplishment hand in your work to your instructor for his evaluation.
7. He will evaluate your work and indicate to you what to do next.
8. When you have finished this task package you have finished Unit I; "Can you really believe you did the whole thing?"

C-I-15

HOW TO USE
THE STANLEY NAIL HAMMER

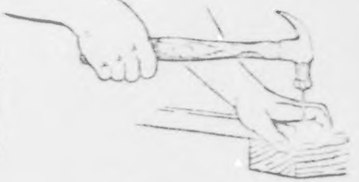


GRASP THE HAMMER FIRMLY NEAR THE END

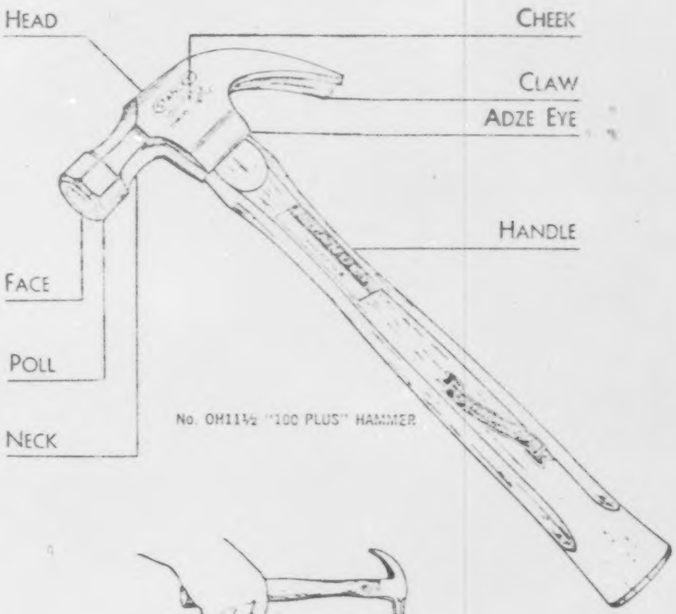


THE BLOW IS DELIVERED THROUGH THE WRIST, THE ELBOW AND THE SHOULDER, ONE OR ALL BEING BROUGHT INTO PLAY, ACCORDING TO THE STRENGTH OF THE BLOW TO BE STRUCK. REST THE FACE OF THE HAMMER ON THE NAIL, DRAW THE HAMMER BACK AND GIVE A LIGHT TAP TO START THE NAIL AND TO DETERMINE THE AIM

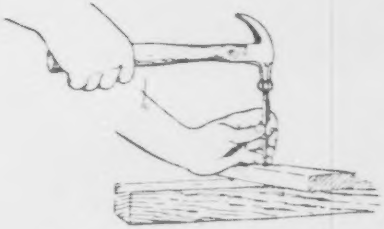
STRIKE THE NAIL SQUARELY TO AVOID MARRING THE WOOD AND BENDING THE NAIL. KEEP THE FACE OF THE HAMMER CLEAN TO AVOID SLIPPING OFF THE NAIL. IF A NAIL BENDS, DRAW IT AND START A NEW ONE IN A NEW PLACE



ALWAYS STRIKE WITH THE FACE OF THE HAMMER. IT IS HARDENED FOR THAT PURPOSE. DO NOT DAMAGE THE FACE BY STRIKING STEEL HARDER THAN ITSELF. DO NOT STRIKE WITH THE CHEEK AS IT IS THE WEAKEST PART

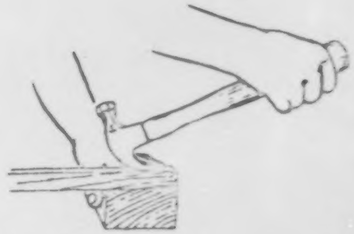


No. OH11½ "100 PLUS" HAMMER

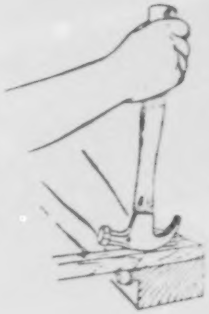


USE A NAIL SET TO DRIVE NAILS BELOW THE SURFACE OF ALL FINE WORK. TO PREVENT THE NAIL SET SLIPPING OFF THE HEAD OF THE NAIL, REST THE LITTLE FINGER ON THE WORK AND PRESS THE NAIL SET FIRMLY AGAINST IT. SET NAILS ABOUT 1/16" BELOW THE SURFACE OF THE WOOD

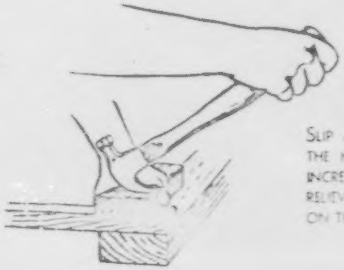
A BELL FACE HAMMER IS SLIGHTLY MORE CONVEX THAN A PLAIN FACE HAMMER. WITH IT A NAIL CAN BE DRIVEN FLUSH OR SLIGHTLY BELOW THE SURFACE OF THE WORK, WITHOUT LEAVING HAMMER MARKS IN THE WOOD



TO DRAW A NAIL SLIP THE CLAW OF THE HAMMER UNDER THE NAIL HEAD, PULL UNTIL THE HANDLE IS NEARLY VERTICAL AND THE NAIL PARTLY DRAWN



IF THE PULL IS CONTINUED UNNECESSARY FORCE IS REQUIRED THAT WILL BEND THE NAIL, MAR THE WOOD AND PERHAPS BREAK THE HAMMER HANDLE



SLIP A PIECE OF WOOD UNDER THE HEAD OF THE HAMMER TO INCREASE THE LEVERAGE AND TO RELIEVE THE UNNECESSARY STRAIN ON THE HANDLE

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CHART NO. 20

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RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: CARPENTRY
COURSE: CARPENTRY

CE0039~~30~~29 (6)

C-II

UNIT PACKAGE II: PORTABLE POWER TOOLS

PREREQUISITES: UNIT I

RATIONALE:

In recent years there have been many time saving developments which have increased the carpenter's productivity as well as the quality of his finished work. Chiefly among these developments have been the portable power tools which the carpenter uses almost daily. This list of tools would be quite lengthy; however, in this unit you will only study and learn how to use seven of them. They are: the electric circular saw, the electric jig saw, the portable router, the electric plane, the electric hand drill, the portable sanders, and the electric miter box. If you are to develop the competences needed in handling and using these portable power tools you will have to study consistently and work diligently in order to gain these skills. The proper mastery of these tools will enable you to do a much more professional and easier job later in the course. Continue, now, by reading the General Objective for the unit and the Specific Objectives for each task package within the unit. You should then read the Learning Activity, which will convey to you what is required in this unit and how you are to proceed in the completion of it.

OBJECTIVES:

GENERAL:

Upon completion of this unit you will be able to use portable power tools safely, with skill and confidence when performing basic operations with them.

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Use the electric circular saw for crosscutting and ripping stock at any given angle ± 2°, perpendicular to the surface ± 2°, and on the waste side of the line.
2. Use the electric jig saw for cutting curves and angles on stock with a smooth cut on the waste side of the line and insure that the cut is made to the designated slope angle ± 2°.
3. Trim and cut joints with a portable router on stock so that the specified contour is produced or that the joint fits accurately with a space of no more than 1/32 inch.
4. Plane with the electric plane on the surface and edge of stock to assure that the cut is straight and true, made on the waste side of the line, and at the prescribed angle ± 2°.
5. Use the electric hand drill to drill holes of various sizes at a prescribed point through a piece of stock at a 90° angle ± 2° to surface.

OBJECTIVES (cont'd):

6. Sand with the portable belt and vibrating sanders on the edge or face of stock, producing a smooth true surface with no nicks or gashes.
7. Use the electric miter box to make specified angular cuts at ± 2° on the waste side of a piece of stock so that a uniform line remains.

LEARNING ACTIVITY:

This unit consists of seven task packages which may be completed in random order provided all prerequisites are satisfied. In the completion of these packages, you will be asked to view sound-slide packages, do readings, answer questions, and perform certain basic operations using the portable power tools.

The names of the task packages included in this unit are as follows:

TASK PACKAGE 1: ELECTRIC CIRCULAR SAW
TASK PACKAGE 2: ELECTRIC JIG SAW
TASK PACKAGE 3: ROUTER
TASK PACKAGE 4: ELECTRIC PLANE
TASK PACKAGE 5: ELECTRIC HAND DRILL
TASK PACKAGE 6: BELT AND VIBRATING SANDERS
TASK PACKAGE 7: ELECTRIC MITER BOX

LEARNING ACTIVITY (cont'd):

After having read Unit Package II thus far, and you feel qualified to pass a comprehensive test covering portable power tools contact your instructor. If you do not feel ready to be tested proceed to begin work on Task Package 1 of this unit.

C-II-1

UNIT II: PORTABLE POWER TOOLS

TASK PACKAGE 1: ELECTRIC CIRCULAR SAW

PREREQUISITES: UNIT I, TASK PACKAGES 1-15

RATIONALE:

In recent years there have many time saving developments which have increased the carpenter's productivity as well as the quality of his finished work. One such development is the electric circular saw. Among this saw's many and varied uses are cross cutting and ripping stock at any number of predetermined angles. This saw may be used with a fence or guide to aid in the sawing process. When the fence is removed the saw may be moved across the stock in a free hand manner. You will be given an opportunity to use the electric circular saw to do both cross cutting and ripping with and without the guide. Now as you continue this task package, read the Objective and do the Learning Activity and Learning Practice. Be sure to keep the Objective in mind as it sets forth your goal and also tells you when you have reached it.

OBJECTIVE:

Upon completion of this task package you will be able to use the electric circular saw for cross cutting and ripping stock at any given angle ±2°, perpendicular to the surface ±2°, and on the waste side of the line.

LEARNING ACTIVITY:

1. View sound-slide package #C-II-1.
2. Read and study carefully Modern Carpentry, pages 27-29, and to Saber saws on page 30. Copy down on a sheet of paper each of the 10 safety rules and review them in detail. Have this list with you when you start the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Electric circular saw
2. A piece of stock 3/4" thick 6" wide and approximately 2 feet long
3. Folding wood rule
4. Pencil
5. Combination Square

1. On one face of the piece of stock lay off a line 1" in from one end and at right angles to the edge.

LEARNING PRACTICE (cont'd):

2. Following the safety rules and the procedures outlined in Modern Carpentry, pages 27-30, clamp the stock on the work surface, and crosscut the wood on the waste side of the line. Check the squareness of the cut with a combination square.
3. Lay out two 45° angles on the face of this same piece of stock; that is, an angle at each end. Proceeding as in #2 cut each angle on the waste side of the line and check for squareness.
4. Lay out a line on the face of the board, 5" from one edge and running parallel to this edge. This line is to be drawn the entire length of the board.
5. Using the procedure outlined in Modern Carpentry, pages 27-30, clamp the stock to the working surface, adjust the fence to the correct width of cut and make a ripping cut the entire length of the stock. Cut on the waste side of the line and check for squareness.
6. If you are satisfied that you have completed the sawing exercise correctly, check yourself by the standards in the Objective and then have your instructor evaluate your finished job.
7. Upon the direction of the instructor proceed to the next task package.
8. You've got a lot to live, and a task package has a lot to give.

C-II-2

UNIT II: PORTABLE POWER TOOLS

TASK PACKAGE 2: ELECTRIC JIG SAW

PREREQUISITES: UNIT I; UNIT II, TASK PACKAGE 1

RATIONALE:

In Task Package 1 of this unit you used an electric circular saw. You no doubt observed, that although it does a beautiful job in crosscutting and ripping, it cannot be used for cutting curves. There is, however, a portable power saw that can be used to perform this operation. The carpenter finds many uses for the electric jig saw or saber saw as it is often called. He may use it to cut wooden stock, sheet rock, ceiling tile, and a multitude of other materials. In this task package you will gain skill in using the electric jig saw to make straight and angular cuts. Proceed by reading the Objective and doing the Learning Activity and the Learning Practice. Happy sawing!

OBJECTIVE:

Upon completion of this task package you will be able to use the electric jig saw for cutting curves and angles on stock with a smooth cut on the waste side of the line and insure that the cut is made to the designated slope angle ± 2°.

LEARNING ACTIVITY:

1. View sound-slide package #C-II-2.
2. Read Modern Carpentry, pages 30 and 31, the section on Saber Saws. Copy the safety rules and study them carefully. Retain this list for your use when performing the Learning Practice.
3. This finishes your Learning Activity; begin now with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Electric jig (Saber) saw complete with blade
2. Piece of scrap stock
3. Compass
4. Pencil
5. Brace and auger bit
6. Combination square
7. Folding wood rule

1. On the face of the piece of stock, lay out a rectangular opening [illegible]" x [illegible]". The placement of this opening on the board should be similar to that shown in figure 2-9, page 31 in Modern Carpentry.
2. Bore holes at all four corners. Insert the blade into one hole and proceed to cut out the opening as illustrated on page 31 of the above reference. Note: Make sure the bed is resting flat on the stock and is adjusted at right angles to the face of the board. Did you cut on the waste side of the line?

LEARNING PRACTICE (cont'd):

3. Lay off a 45° angle on one end of the stock. Cut this corner off on the waste side of the line following the procedure outlined in Modern Carpentry.
4. Lay off and draw a 5" diameter circle on the face of the stock; the circle should not touch the edges nor the ends of the workpiece. Bore a starting hole, insert the blade, and cut out the circle. (See figure 2-8 B in Modern Carpentry.)
5. In an area on the board not previously cut, lay off a 45° miter cut so that it is 45° to the face, 90° to the edge.
6. Adjust the bed to a 45° angle and make the mitered cut as illustrated in Figure 2-8E in Modern Carpentry.
7. Turn in the finished job to your instructor for his evaluation.
8. Upon satisfactory completion of this exercise he will direct you to the next task package.
9. Finishing a packet is the real thing.

C-II-3

UNIT II: PORTABLE POWER TOOLS

TASK PACKAGE #3: ROUTER

PREREQUISITES: UNIT I; UNIT II, TASK PACKAGES 1-2

RATIONALE:

When the carpenter has to cut irregular shapes and various contours on the edges of wood he selects the portable router to do these jobs. The router may also be used for a variety of other purposes when equipped with special guides. In this task package you will be given the opportunity to perform certain basic cuts using the portable router so that you may develop skill and confidence in its use. In continuing, first, read the Objective and then do the Learning Activity and the Learning Practice, referring back to the Objective as often as necessary. Have a "routing" good time with this task package.

OBJECTIVE:

Upon completion of this task package you will be able to trim and cut joints with a portable router on stock so that the specified contour is produced or that the joint fits accurately with a space of no more than 1/32 inch.

LEARNING ACTIVITY:

1. View sound-slide package #C-II-3.
2. Read Modern Carpentry, pages 35 and 36. Study the pictures of the portable router and make a listing of the safety rules and hold until later.
3. In Fundamentals of Carpentry, Volume 1, read page 69 on The Portable Router.
4. This completes your Learning Activity; move on to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Portable Router with an assortment of bits
2. Two pieces of scrap 3/4" stock
3. Combination square
4. Pencil

1. On one of the two pieces of stock you are to use the router to cut a 1/4" round on the edge. This cut should extend the entire length of the piece. See Figure 1.
    a. Select the proper router bit to perform this operation. Mount the bit in the router chuck, clamp your stock on a working surface, adjust the router to depth, set the fence to width, and make the cut. (See pages 35 and 36 in Modern Carpentry for the procedure in doing this).

LEARNING PRACTICE (cont'd):

2. On the other piece of stock lay out a rabbet joint (see Figure 2) on one edge running the entire length of the board. The joint should be cut half way through the thickness of the wood (3/8" deep) and be 3/4" wide.
   a. Using the procedure outlined in Modern Carpentry, pages 35 and 36, cut the joint with the proper router bit.
3. Now, take board #1 and place the edge into the rabbet joint on board #2 so that the joint fits together as shown in Figure #3.
4. Evaluate your finished job by comparing it against the Objective. When satisfied that you have mastered this exercise turn in your work to your instructor.
5. If you completed the job to the satisfaction of your instructor, he will suggest that you begin on the next task package.
6. Man, you're really hanging in there!

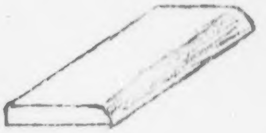


Figure 1

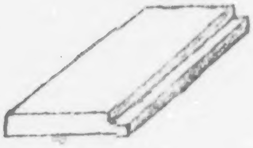


Figure 2

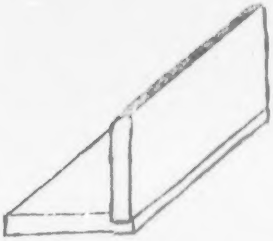


Figure 3

C-II-4

UNIT II: PORTABLE POWER TOOLS

TASK PACKAGE #4: ELECTRIC PLANE

PREREQUISITES: UNIT I; UNIT II, TASK PACKAGES 1-3

RATIONALE:

When the carpenter finds it necessary to remove a small or medium amount of material from the surface or the edge of wood and leave a smooth, true surface, he generally uses the electric plane. This device is a relatively recent innovation which now does many of the operations that were performed by the older and slower hand planes. You can readily see the time saving advantages brought about with this plane's development. In carpentry as in a number of trades, "time is money." Now, let's learn how to use the electric plane to plane the edge and surface of the stock. Continue by reading the Objective and doing the Learning Activity and Learning Practice. When you use this tool you will discover it to be just "plane" simple.

OBJECTIVE:

Upon completion of this task package you will be able to plane with the electric plane on the surface and edge of stock to assure that the cut is straight and true, made on the waste side of the line, and at the prescribed angle ± 2°.

LEARNING ACTIVITY:

1. View slide-sound package # C-II-4.
2. Read carefully Modern Carpentry, pages 34 and 35, about power planes. Study figure 2-17, page 32, which shows the various parts of the power plane. Make a list of all the safety rules for the plane and retain this list.
3. Read Fundamentals of Carpentry, Volume I, pages 68 and 69, the section on the power plane.
4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools & Equipment

1. Power plane with cutter bit.
2. Piece of scrap stock.
3. Combination square.
4. Pencil.

1. On your piece of stock scribe a 1/16" line entirely around

LEARNING PRACTICE (cont'd):

the wood, measuring from the same face and drawing the line on both edges and ends.

2. Clamp your stock securely on the work bench and plane the stock down to the 1/16" line following the procedure outlined in Modern Carpentry, pages 34 and 35. (NOTE - Be sure to follow the safety rules.)
3. Remove the stock and mark a 1/8" line around the wood (on both faces and both ends) measuring down from one edge.
4. Following the procedure outlined in Modern Carpentry, clamp the workpiece securely in place. Using the electric plane now equipped with a fence, plane the edge of the stock down to the 1/8" line. (NOTE- the fence should be placed against the smooth, true face produced in step #2.)
5. Check your finished work and when satisfied that the Objective has been met, hand in the workpiece to your instructor.
6. If you have completed the job to your instructor's satisfaction, you will be directed to the next task package.
7. Move on to the next task package so you can see if you--------- "try it, you'll like it."

C-II-5

UNIT II: PORTABLE POWER TOOLS

TASK PACKAGE 5: ELECTRIC HAND DRILL

PREREQUISITES: UNIT I; UNIT II, TASK PACKAGES 1-4

RATIONALE:

No doubt at one time or another you have already used an electric hand drill. But, have you used it correctly and have you cared for it properly? By all means, when using the electric hand drill as well as other power tools, be sure to have them properly grounded. We certainly wouldn't want to happen to you what is happening to the man in figure #1. Now, let's get over the "shock" and proceed with this task package in which you will learn how to properly drill holes in stock and also learn the types of bits and attachments available for your use. Continue, by reading the Objective and doing the Learning Activity and Learning Practice. One well drilled hole deserves another.

OBJECTIVE:

Upon completion of this task package you will be able to use the electric hand drill to drill holes of various sizes at a prescribed point through a piece of stock at a 90° angle ±2° to the surface.

LEARNING ACTIVITY:

1. View sound slide package #C-II-5.
2. Read Modern Carpentry, page 32, about The Portable Electric Drill, and study figure 2-12 which shows the drill with its parts identified. Note the various bits that may be used and the attachments that are available.
3. Copy from Modern Carpentry the safety rules for the drill and hold this list as it should be referred to when the drilling operations start.
4. This completes your Learning Activity; begin now with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Electric hand drill
2. Chuck key
3. An assortment of twist drill bits
4. Pencil
5. An assortment of power bits
6. Hammer
7. Nail
8. Scrap piece of 3/4" stock

1. Drilling holes with twist drills (Refer to Modern Carpentry, page 32):
   a. On the face of the stock locate the centers for 6 holes spaced far apart.
   b. Clamp the stock firmly in place at your work station.

LEARNING PRACTICE (cont'd):

   c. At each of the 6 centers for the holes, use a nail and hammer to punch a shallow starting hole which serves as a guide for the bit point.

   d. Select twist drill bit sizes 1/8", 3/32", 3/16", and 1/4" to be used in drilling 4 of the six holes.

   e. Chuck each bit in succession and drill 4 holes through the stock, following the procedure outlined in Modern Carpentry. (Care should be taken not to split out the stock on the back side. The stock may be backed up with another piece of stock).

2. Drilling holes with power bits:

   a. Using the 3/8" power bit, chucked as before, drill a hole through the stock.

   b. Drill a 1/2" hole with a power bit.

3. If you are satisfied you followed the correct procedure and have met the objective, let the instructor see your work.

4. If your job was completed in a satisfactory manner, he will have you begin on the next task package.

5. This is the package generation.

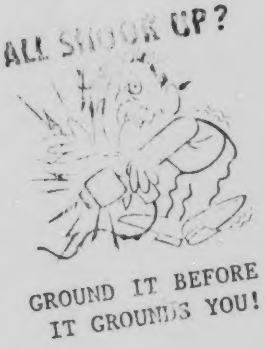

ALL SHOOK UP?
GROUND IT BEFORE IT GROUNDS YOU!

Figure 1

C-II-6

UNIT II: PORTABLE POWER TOOLS

TASK PACKAGE #6: BELT AND VIBRATING SANDERS

PREREQUISITES: UNIT II, TASK PACKAGES 1-5

RATIONALE:

Have you ever tried to sand a piece of wood by hand and get it smooth? If so, you know that it takes a great deal of time and considerable effort to sand the stock smooth. Fortunately for you and the carpenter, sanding machines have been developed which make the work much easier and many times improve the quality of the finished product. In this task package you will have the opportunity to use two portable sanders, the belt sander and the vibrating or (finish sander). Although the belt sander requires skillful manipulation, it is felt that you can use it with confidence since you have mastered many other portable power tools. Continue now by reading the Objective and doing the Learning Activity and Learning Practice. Happy sanding!

OBJECTIVE:

Upon completion of this task package you will be able to sand with the portable belt and vibrating sanders on the edge or face of stock, producing a smooth, true surface with no nicks or gashes.

LEARNING ACTIVITY:

1. View slide-sound package C-II-6.
2. Read Modern Carpentry, page 36, paying attention to the procedure to be followed in sanding a board.
3. Pretend that you have a belt sander in your hands now and explain to a classmate how you would sand a board, giving him a demonstration and explaining each step of the procedure.
4. This concludes your Learning Activity; begin, now, with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Belt sander
2. Individual belt for belt sander
3. Vibrating sander and abrasive sheet
4. Piece of scrap stock

1. Sanding with belt sander: (Procedure outlined in Modern Carpentry, page 36, to serve as the guide).

LEARNING PRACTICE (cont'd):

a. Clamp stock to work surface with one face up.

b. Align belt in sander following the procedure in Modern Carpentry and that covered in the sound-slide package. (Remember the smooth edge of the belt contacts the surface of the wood first and the belt is tracked with the tracking adjustment screw.)

c. Sand the face of the stock, keeping the sander in motion as outlined in the procedure. When finished check your work for nicks or gashes.

2. Sanding with vibrating sander: (Modern Carpentry to serve as the guide).

   a. Clamp same piece of stock onto work surface with other face up.

   b. Install abrasive sheet onto pad plate of sander following outlined procedure.

   c. Sand the face of the board following the procedure outlined in your guide. Check the sanded surface for nicks or gashes.

   d. Reclamp stock so that an edge of the board is up.

   e. Sand this edge with the vibrating sander following the same procedure.

3. When you are satisfied with your work let the instructor check your completed job.

LEARNING PRACTICE (cont'd):

4. If you have finished the exercise satisfactorily you will be asked to begin the next task package.
5. You thought sanding was "rough"; it's really "smooth."

C-II-7

UNIT II: PORTABLE POWER TOOLS

TASK PACKAGE #7: ELECTRIC MITER BOX

PREREQUISITES: UNIT I; UNIT II, TASK PACKAGES 1 - 6

RATIONALE:

Already you have studied about and used the hand crosscut saw and the miter box saw for making square and angular cuts on a piece of stock. You learned that the miter box saw was faster and more accurate than the crosscut saw. But, did you know that in recent years there has been a new development which makes these saws somewhat out of date? This new saw is called an electric (or motorized) miter box and produces cuts on molding and other stock, that are faster, smoother, and more accurate than either of the other two saws. In this task package you will be given the opportunity to develop skill in the use of the electric miter box to make square and angular cuts. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice. The electric miter box can increase the earnings of a carpenter if he uses it well.

OBJECTIVE:

Upon completion of this task package you will be able to use the electric miter box to make specified angular cuts ± 2° on the waste side of a piece of stock so that a uniform line remains.

LEARNING ACTIVITY:

1. View sound-slide package #C-II-7; make notes on how to adjust the saw and also on how to make square and angular cuts.
2. Review carefully Task Package #C-I-8, Miter Box Saw, studying the procedure for performing sawing operations.
3. Study the sheet attached to this package entitled Safety Suggestions for Rockwell Motorized Miter Box. Be sure to refer to this sheet while doing the Learning Practice.
4. This completes your Learning Activity; begin now on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Electric Miter Box
2. Piece of stock
3. Combination Square
4. Sliding T - bevel
5. Protractor

1. Study the attached sheet (Motorized Miter Box) again before starting.

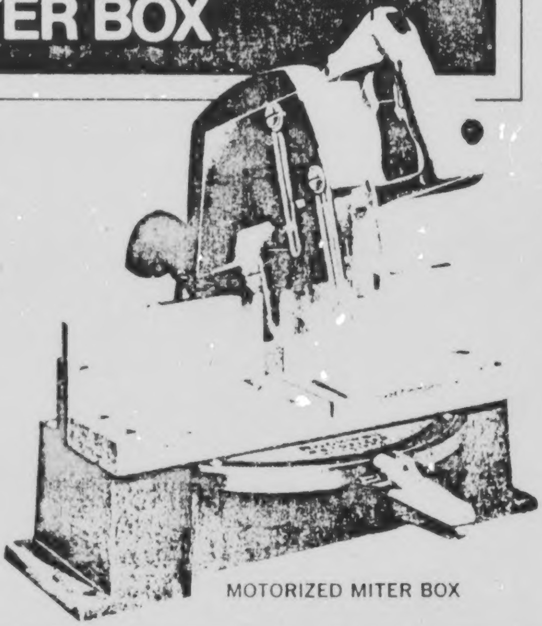
LEARNING PRACTICE (cont'd):

2. Adjust the saw to cut straight across the board and at a 90° angle to the face (refer to your notes taken from sound-slide package #C-II-7.)
3. Place the stock on the saw table with one face flat on the table and one edge fitting squarely against the fence. Move your work piece to the left to allow for a cut of approximately 1 inch in from the right end.
4. Hold stock firmly against the fence with the left hand well out of the path of the saw blade.
5. With the right hand grasping the handle pull the trigger to turn on the saw, lower the saw and pull it across the stock. Release the trigger, let saw swing up into place and apply the brake to stop the blade.
6. Remove stock from table and check squareness of cut with a combination square.
7. Adjust saw to make a 45° angle cut to the right. Replace stock on the table and saw the 45° angle on the right end of the board (cut entirely across the stock but do not saw into your first 90° angle.) Check your accuracy with the combination square.
8. Adjust saw to 45° left and make this cut also on the right end of the board, taking care not to saw across a previous cut. Check accuracy.

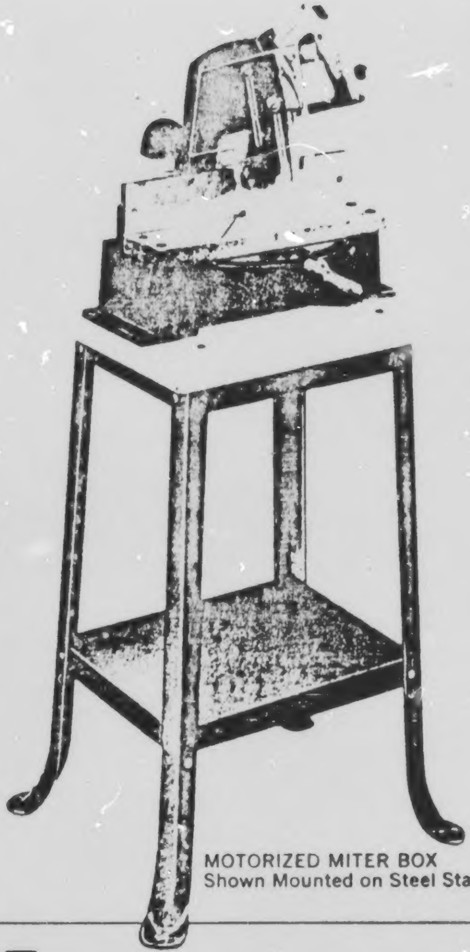
LEARNING PRACTICE (cont'd):

9. Make a 60° angle cut to the left on the same end as before (Do not cut away another angle.) Check your work with the T-bevel.
10. Make a 30° angle cut again on the right end of the board, (not cutting into a previous angle.) Check your work for accuracy.
11. When you are sure all your saw cuts were made on the proper angles, take all your work (several pieces by now) to your instructor for his evaluation.
12. If you have completed the exercise satisfactorily, it will be suggested what you should do next.
13. We're on your side, Charlie Brown.

SAFETY SUGGESTIONS FOR ROCKWELL MOTORIZED MITER BOX



MOTORIZED MITER BOX



MOTORIZED MITER BOX
Shown Mounted on Steel Stand

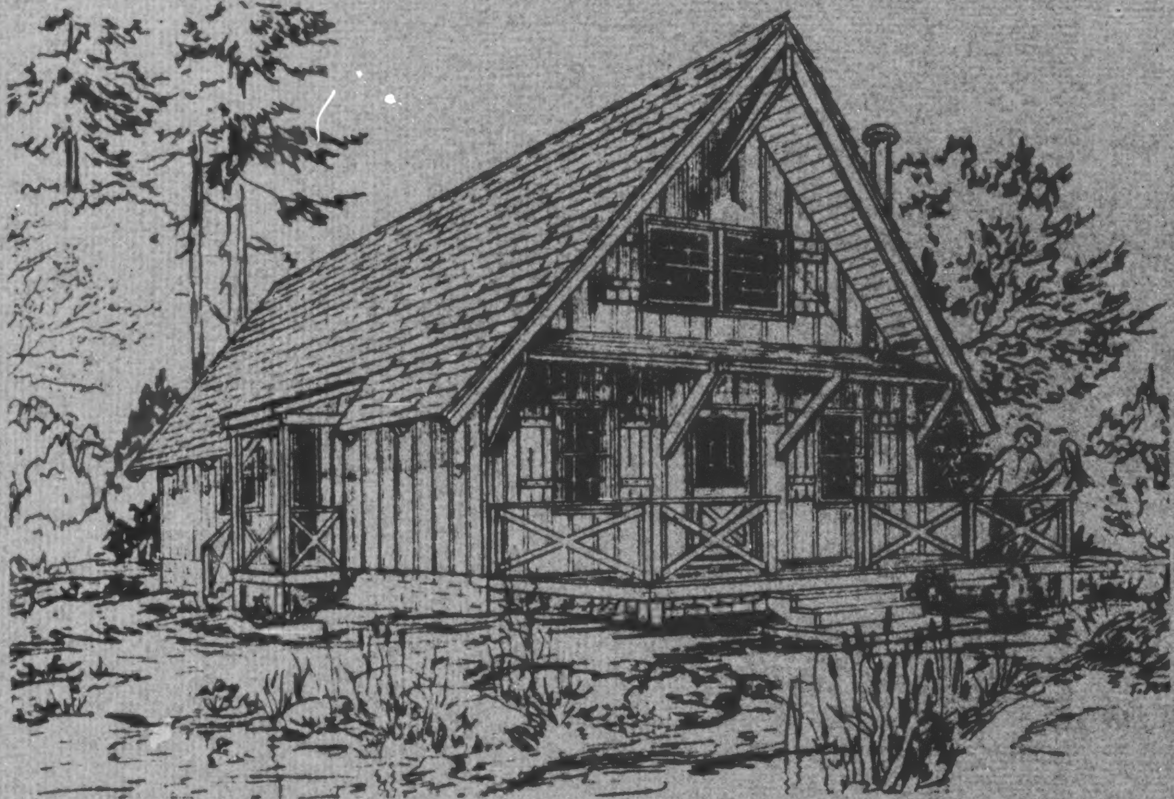
1. IF YOU ARE NOT thoroughly familiar with the operation of a Motorized Miter Box, obtain advice from your supervisor, instructor or other qualified person.
2. MAKE SURE wiring codes and recommended electrical connections are followed and that machine is properly grounded.
3. HAVE the power disconnected when making any adjustment.
4. REMOVE tie, rings, watch and other jewelry and roll up sleeves.
5. ALWAYS WEAR safety glasses or a face shield.
6. ALWAYS HOLD the work firmly against the fence.
7. GUARDS should be in place and used at all times.
8. REMOVE CHIPS and pieces of scrap from table before using machine.
9. BE SURE blade is sharp, free cutting and free from vibration.
10. ALLOW the motor to come up to full speed before starting cut.
11. RELEASE the trigger switch before applying the brake.
12. IMPORTANT! USE THE BRAKE to bring the blade to a stop before reaching out to pick up a piece of work, a piece of scrap, or anything else which is in or near the cutting path of the blade.
13. USE THE BRAKE to bring the machine to a stop before leaving the machine unattended.

RESEARCH PROJECT

SANFORD CENTRAL HIGH SCHOOL

1708 NASH STREET

SANFORD, NORTH CAROLINA 27330



CLUSTER: CARPENTRY

COURSE: CARPENTRY

C-III

UNIT PACKAGE III: WORKING MACHINE TOOLS

PREREQUISITES: UNITS I AND II

RATIONALE

Although a carpenter may not have all of the woodworking machine tools (covered in this unit) available on the job site, nevertheless, he should know how to properly, safely, and efficiently use them. The woodworking machine tools covered in this unit are: the radial arm saw, the planer, the table saw, the bandsaw, the jointer, the woodshaper, and the drill press. In order to develop the competencies needed when using these machines, you will be given the opportunity to study about them and perform certain operations using the tools. Through the development of knowledge and skill you will be able to do a more professional job on the work that will come later in the course. Continue, by reading the General Objective for the unit and the Specific Objectives for each task package within the unit. You should then read the Learning Activity, which will describe what you are to do in this unit and how you are to accomplish it.

OBJECTIVES:

General:

Upon completion of this unit you will be able to: use woodworking machine tools safely, with skill and confidence in performing certain basic operations.

OBJECTIVES (cont'd):

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Use the radial-arm saw to crosscut stock:
    a. perpendicular to the face and at any angle varying from 45° left to 45° right.
    b. perpendicular to the face and beveled 45° to the edge.
    c. across the grain at any angle varying from 45° left to 45° right, and produce a dado not to exceed one half the thickness of the stock.

    The total allowable variation for all angles is ± 2°.
2. Plane stock with the grain to specified thickness, on a planer to an accuracy of 1/32 inch.
3. Perform ripping and crosscutting on the table saw so that the cut will be perpendicular to the face of the stock, on the waste side of the line, straight and clean, and to within 1/32 inch dimensions or ± 2° for angles.
4. Use the bandsaw for cutting curves and angles on stock so that the freehand cut is at right angles to the face of the stock ± 2°, is smooth and clean, and is on the waste stock, leaving a uniform line.

OBJECTIVES (cont'd):

5. Plane stock on the edge, using the jointer to assure a straight uniform cut at a 90° angle ± 2° to the surface of the wood.
6. Use the woodshaper to smooth edges and cut patterns on stock so that the edges are uniformly smooth and true and that the pattern matches the shape specified, deviating no more than 1/32 inch. The stock is to be checked by the instructor against the model provided.
7. Use the drill press to:
    a. drill holes through stock at a specified location and 90° to the surface ± 2°.
    b. countersink holes into stock so that a specified flat head screw will rest flush with the surface of the wood.
    c. counterbore holes in stock to a specified diameter and depth of ± 1/32 inch.
    d. drum sand an irregular curve so that a smooth surface is produced and a uniform line remains on the stock.

LEARNING ACTIVITY:

This unit on Woodworking Machine Tools consists of seven task packages which may be completed in random order provided all prerequisites are satisfied. In completing these packages you will view sound-slide packages, read, answer questions, and perform basic operations as directed.

LEARNING ACTIVITY (cont'd):

The task package titles within this unit are:

TASK PACKAGE 1: RADIAL ARM SAW

TASK PACKAGE 2: PLANER

TASK PACKAGE 3: TABLE SAW

TASK PACKAGE 4: BANDSAW

TASK PACKAGE 5: JOINTER

TASK PACKAGE 6: WOODSHAPER

TASK PACKAGE 7: DRILL PRESS

At this point, if you feel qualified to pass a comprehensive test covering woodworking machine tools you should contact the instructor for the examination. If, however, you do not believe you are ready to be evaluated you should proceed to work on the first task package in this unit.

C-III-1

UNIT III: WOODWORKING MACHINE TOOLS

TASK PACKA[illegible] RADIAL ARM SAW

PREREQUISITES [illegible]TS I - II

RATIONALE:

One of the most versatile of the stationary woodworking machine tools is the radial arm saw. Its uses and capabilities are many and varied. On many building sites you will find the radial arm saw set up and being used regularly to make various types of cuts on wooden stock used in building a house. In this package you will learn how to make cuts across wood that are straight and at different angles. You will also learn how to cut dados at angles on the face of a board. Using this saw skillfully and carefully will add much to your knowledge and ability and make you a much more valuable employee. Ready to go to work? Proceed by reading the *Objective* and doing the *Learning Activity* and the *Learning Practice*, referring back to the *Objective* as often as you feel necessary.

OBJECTIVE:

Upon completion of this task package you will be able to use the radial arm saw to cross cut stock:

a. perpendicular to the face and at any angle varying from 45° left to 45° right.

b. perpendicular to the face and beveled 45° to the edge.

c. across the grain at any angle varying from 45° left to 45° right, and produce a dado not to exceed one half the thickness of the stock.

The total allowable variation for all angles is ± 2°.

LEARNING ACTIVITY:

1. View slide-sound package # C-III-1.
2. Read Modern Carpentry, pages 38-39, carefully and study thoroughly the picture of the radial arm saw on page 37, Figure 2-29.
3. Copy the list of safety rules for the radial arm saw as shown on page 38 in Modern Carpentry and retain this list for later use.
4. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Radial arm saw
2. Two pieces of stock
3. Combination square

1. Discuss with your instructor the safety rules and procedure for using the radial arm saw.
2. All operations on the exercises in this task package are to follow the procedure outlined in Modern Carpentry, pages 38-39, and sound-slide package # C-III-1.
3. Set up the saw to make a perpendicular cut straight across the board. Crosscut one of your pieces of stock approximately 1" in from the right end at right angles to the edge and the face of the board.
4. Make adjustments only when saw has stopped!
5. Adjust the saw to make a 45° angle cut to the right with the blade still set at 90° to the face of the stock. Make this cut on the same end of the board used in step # 2, taking care not to saw into the first cut.
6. Adjust the saw to a 45° angle to the left. (Do not tilt the blade.) Saw this angle on the same end of the stock, making sure not to cut into the previous angle.

LEARNING PRACTICE (cont'd):

7. Adjust the saw blade so that it will cut straight across a board. Now, tilt the blade 45° clockwise. This cut should be made close to the previous cut in step # 5 but not touching it.

8. Ask your instructor to install a dado head on the radial arm saw, if you are to cut a dado using the head. (Note carefully the installation of this attachment.)

9. Note the thickness of the dado head (1/2", 3/4", etc.). On your second piece of stock and at a 90° angle to one edge lay out the correct width dado on the face of the stock and to 1/2 of the board's thickness. (Note: A dado is a groove that is cut across grain but does not go through the complete thickness of the board.)

10. Adjust your dado head to the correct depth and make the cut so that the head passes between the two parallel lines.

11. A dado may be cut with the regular saw blade by cutting on the waste side of each of the parallel lines and then removing the remaining stock with a series of cuts.

12. Evaluate all your work in terms of the Objective and, when satisfied, turn in the finished job to your instructor.

13. If you have completed the job satisfactorily you will be directed to the next task package.

14. Congratulations! You can be proud of your competency.

UNIT III: WOODWORKING MACHINE TOOLS

TASK PACKAGE # 2: Planer

PREREQUISITES: UNITS I-II; UNIT III, TASK PACKAGE # 1

RATIONALE:

When it becomes necessary to plane a board to a uniform thickness, nothing does the job easier, faster, or with more accuracy than the planer (sometimes called a surfacer). This machine is very easy to adjust to a given thickness and use if the operator keeps the operating procedure and safety rules clearly in mind. In this task package you will learn how to plane stock to thickness and to recognize grain direction on wood so that the stock can be fed into the knives with the grain. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to plane stock with the grain to specified thickness on a planer to an accuracy of ± 1/32 inch.

LEARNING ACTIVITY:

1. View slide-sound package # C-III-2.
2. Read and study carefully Technical Woodworking, pages 192-195, on the thickness planer (or surfacer). Pay particular attention to the operating procedure and the safety rules.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Thickness planer
2. One piece of 3/4" stock at least 14" long
3. Framing square
4. Folding wood rule

1. Discuss the operation of the planer with your instructor before starting.
2. Select the piece of wood with one face flat and true and determine its grain direction.
3. Following the procedure outlined on pages 194-195 of Technical Woodworking, plane the board's uneven face flat and true, reducing the board's thickness to 1/2". Never plane stock less than 1/4" thick or less than 14" long.
   a. Note: Make sure the board is fed into the planer, uneven face up, so that the cut will be made with the grain.
   b. Adjust the planer for thickness; the first cut should be 1/16" less than the maximum thickness of the board.

LEARNING PRACTICE (cont'd):

4. Check the board's planed face; if not completely level adjust the depth 1/16" more and plane the surface as before.
5. Continue the process until the board is to the correct thickness (1/2" in this case). Check the surface with the framing square to determine if the surface is flat and true.
6. When you are satisfied that your work has met the Objective, turn in your finished job to the instructor.
7. If your exercise was completed in a satisfactory manner your instructor will tell you to go to the next task package.
8. Come on up to cool accomplishment.

UNIT III: WOODWORKING MACHINE TOOLS

TASK PACKAGE # 3: TABLE SAW

PREREQUISITES: UNITS I-II; UNIT III, TASK PACKAGE # 1

RATIONALE:

In task package # 1 of this unit you did an exercise in which you used the radial arm saw to make square and angular cuts on stock. You will also recall that the blade cut the wood from above. The same operations could have been performed on the table saw with two important differences: (1) On the table saw the blade cuts from below, and (2) the stock moves across the blade instead of remaining stationary as it did on the radial arm saw. You will learn how to cross cut and rip stock with skill and confidence on the table saw. Ready? All right. Continue by reading the Objective and doing the Learning Activity and the Learning Practice. The Objective sets forth your goal, so refer to it as often as necessary.

The table saw is a necessary tool for the complete carpenter. Learn to know it well.

OBJECTIVE:

Upon completion of this task package you will be able to perform ripping and cross cutting on the table saw so that the cut will be perpendicular to the face of the stock, on the waste side of the line, straight and clean, and to within 1/32" dimensions or ± 2° for angles.

LEARNING ACTIVITY:

1. View slide-sound # C-III-3. Pay careful attention to the adjustment levers and devices and the operating procedure used in ripping and crosscutting.
2. Read Modern Carpentry, pages 39-41. Note carefully the procedure for operation of the table saw and the safety rules.
3. Study the sheet entitled Tilting Arbor Saw. This is the last page of this task package and covers many safety suggestions.
4. This completes the Learning Activity; begin, now, on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Table saw.
2. 1 piece of stock with 1 face and 1 edge true and perpendicular to each other.
3. Combination square.

1. Discuss the operating procedure and safety rules with your instructor before beginning.
2. Modern Carpentry, pages 39-41, and sound-slide package #C-III-3 will be used as guides in adjusting and using the table saw. Refer to these sources as needed.
3. Adjust the blade on the table saw to the correct height according to the thickness of your stock. NOTE: Better check your safety rules here.
4. Place the stock on the table of the saw with the smooth face down and the true edge against the miter gage. Make a 90° cut across the stock about 1" in from the right end. Check for squareness.
5. Remove the miter gage and measure the width of your stock. Adjust the fence so that the distance between it and the saw blade is 1/2" less than the width of the board.

LEARNING PRACTICE (cont'd):

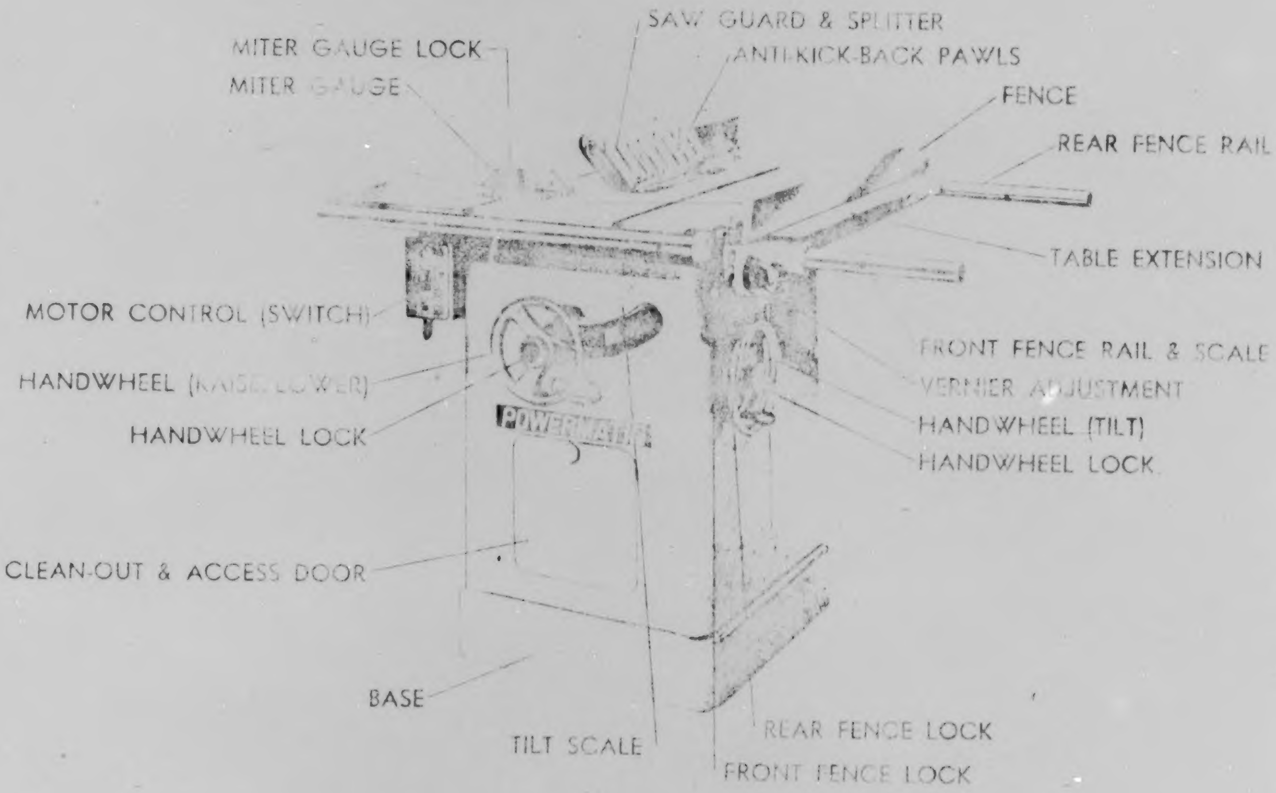
6. Place the board with its true face down and smooth edge against the fence. Rip the stock and then check for squareness.

7. When you are satisfied that you have performed the operation correctly as measured by the Objective, turn in your exercise to your instructor.

8. Upon satisfactory completion of your job, you will be told to advance to the next task package.

9. An elephant would never forget the content of this task package. Will you?

TILTING ARBOR SAW


SAW GUARD & SPLITTER
MITER GAUGE LOCK
ANTI-KICK-BACK PAWLS
MITER GAUGE
FENCE
REAR FENCE RAIL
TABLE EXTENSION
MOTOR CONTROL (SWITCH)
FRONT FENCE RAIL & SCALE
HANDWHEEL (RAISE-LOWER)
VERNIER ADJUSTMENT
HANDWHEEL LOCK
HANDWHEEL (TILT)
HANDWHEEL LOCK
POWERMATIC
CLEAN-OUT & ACCESS DOOR
BASE
REAR FENCE LOCK
TILT SCALE
FRONT FENCE LOCK

VITAL SAFETY SUGGESTIONS

- Use saw guard and a push stick for all operations where they can be used.
- Keep the saws sharp and properly set. It is very dangerous to work with dull and insufficiently set tools.
- Never make machine adjustment when unit is running.
- Keep the floor around the machine clean.
- Do not look around or carry on a conversation when operating the machine, but give it your undivided and uninterrupted attention.
- Stock to be sawed must always be held against one of the fences. Never try to saw "freehand".
- The saw blade must not project more than 1/8 inch above any stock being sawed.
- Stand to one side of the saw, and do not allow any other person to stand in line with the saw.
- Do not reach over the saw. Have a helper or "tail man" to take away the stock.
- Use the clearance block when crosscutting short pieces. Never use the ripping fence as a stop when crosscutting. It may cause a "kickback."
- Roll up your sleeves, tuck in your necktie and do not wear gloves. Loose-fitting, torn, or ragged clothing is dangerous.
- ALWAYS disconnect power source when servicing machine.
- Machine should be grounded to water pipe or central grounding system.

POWERMATIC HOUDAILLE
McMinnville, Tennessee 37110

UNIT III: WOODWORKING MACHINE TOOLS

TASK PACKAGE # 4: BAND SAW

[illegible]: UNITS I-II; UNIT III, TASK PACKAGES 1, 3 & 4

RATIONALE:

Good morning! Welcome aboard C-III-4!

Only a few of the woodworking hand tools are adapted to cutting curves or contours and only one power tool, the portable electric jig saw, provides you with this capability. There is, however, a stationary woodworking machine tool (the band saw) which allows you to saw curves or contours and in addition provides you with the possibility of performing a large variety of different operations on it. You can either make "freehand" cuts on this machine or use a guide such as a miter gage or a ripping fence when cutting your stock. In this task package you will gain skill which you will need later in using the band saw to make "freehand" curves and angular cuts. Continue by reading the Objective and performing the Learning Activity and Learning Practice.

Upon completion of this task package you will be able to use the [illegible] for cutting curves and angles on stock so that the freehand cut is at right angles to the face of the stock ± 2°, is smooth, clean, and is on the waste stock, leaving a uniform line.

LEARNING ACTIVITY:

1. The show for today is sound-slide package # C-III-4. Note particularly the steps in operating the band saw and its adjustment devices.
2. Read Fundamentals of Carpentry, Volume I, pages 61 and 62 on the band saw.
3. Study the sheet entitled Band Saws, which is attached at the end of this task package. Note the names of the band saw and the safety suggestions.
4. This completes the Learning Activity; now begin with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Band saw
2. Scrap piece of stock
3. Combination square
4. Pencil compass
5. Pencil

1. Discuss the band saw with your instructor before beginning.

LEARNING PRACTICE (cont'd):

2. On one face of your piece of stock lay out the shapes as described below:
    a. Using the combination square lay out a 45° angle which is measured from one edge to the other and is located near one end.
    b. At the other end of the stock lay out a 5" diameter circle not touching either edge or the end.
    c. Near the center of the board lay out two freehand "S" shaped curves which go from one edge to the other edge.
3. Adjustment and cutting procedure to be followed will be as covered in sound-slide package #C-III-4; Fundamentals of Carpentry Volume I, pages 61 and 62, and the attached sheet on Band Saws.
4. Adjust the band saw for the thickness of your stock and saw the 45° angle, cutting on the waste side of the line. Remove and check the accuracy of the cut with the combination square. (The angle as well as the squareness with the face of the stock should be checked.)
5. Saw out the 5" diameter circle cutting on the outside of the line (waste side). Check for accuracy.
6. Saw one of the "S" curves, splitting the marked line. Check your accuracy.

[illegible] PRACTICE (cont'd):

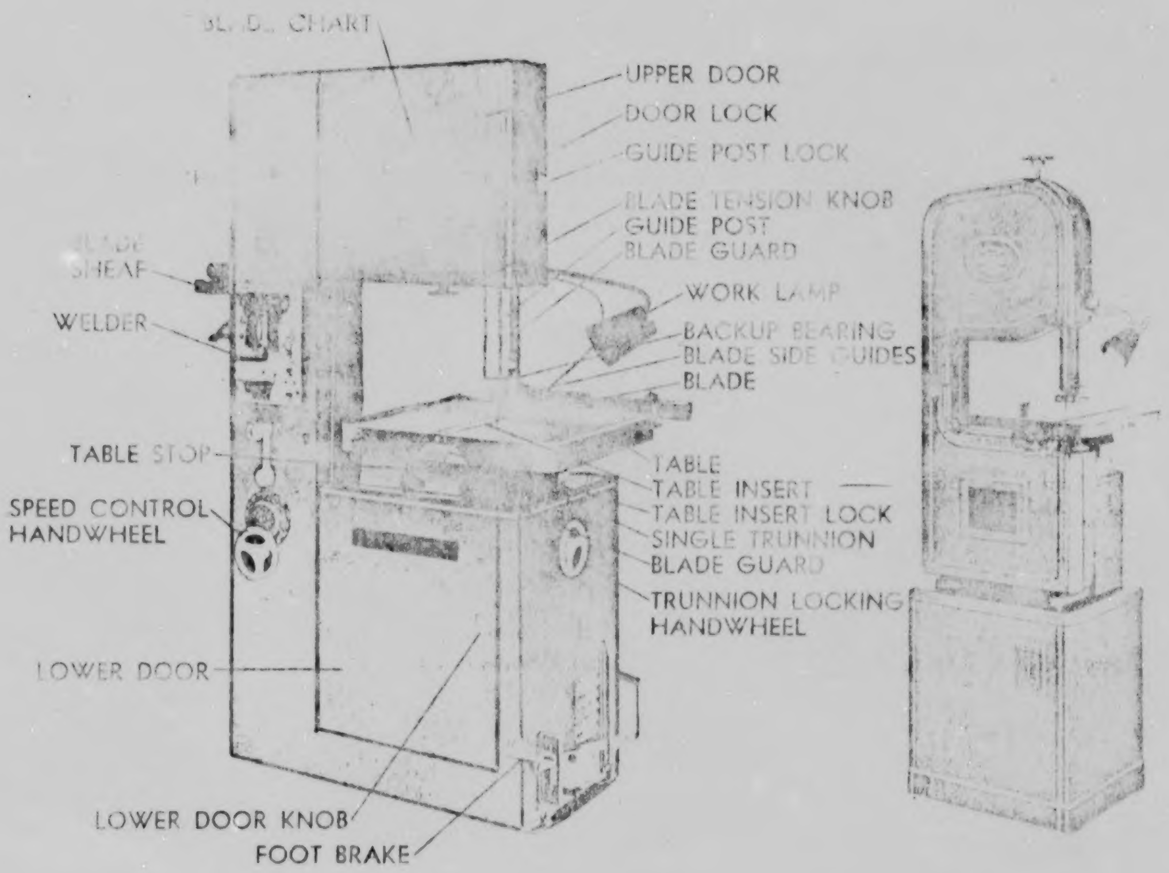
7. Saw the other "S" curve, cutting to either side of the line but leaving a uniform line showing. Check for accuracy. (Note: Save this work piece to use in task package #7 of this unit.)

8. Now, compare your finished work with the Objective to see how well you have done. If satisfied with your job, hand in your stock to the instructor for his evaluation.

9. If your instructor determines you have satisfactorily completed the exercises you will be directed to the next task package.

10. Time is money! Spend it wisely.

BAND SAWS


BLADE CHART
UPPER DOOR
DOOR LOCK
GUIDE POST LOCK
BLADE TENSION KNOB
GUIDE POST
BLADE GUARD
BLADE SHEAF
WELDER
WORK LAMP
BACKUP BEARING
BLADE SIDE GUIDES
BLADE
TABLE STOP
TABLE
TABLE INSERT
SPEED CONTROL HANDWHEEL
TABLE INSERT LOCK
SINGLE TRUNNION
BLADE GUARD
TRUNNION LOCKING HANDWHEEL
LOWER DOOR
LOWER DOOR KNOB
FOOT BRAKE

VITAL SAFETY SUGGESTIONS

- When setting up the machine for any sawing job, rotate handwheel by hand to make certain saw blade tracks properly. Keep table free from tools and material except stick to be cut.
- Always keep blade guard in place and upper lower doors closed during operation.
- Keep saw teeth sharp and properly set.
- Always disconnect power source when servicing machine.
- Good housekeeping is one of the most important of all safety rules.
- Wear safety goggles for added eye protection.
- Roll up your sleeves or wear a shop coat with tight fitting and rather short sleeves. Tuck in your necktie and do not wear gloves.
- Base of machine should be grounded to water pipe or central grounding system.
- Never clean blade area when machine is running.
- Machine should be grounded to water pipe or central grounding system.

C-III-5

UNIT III: WOODWORKING MACHINE TOOLS

TASK PACKAGE 5: JOINTER

PREREQUISITES: UNITS I-II; UNIT III, TASK PACKAGE I

RATIONALE:

Remember how difficult it was to plane the edge grain of a board smooth and true with the jack plane? Ah! You do remember, don't you? There is really good news because, with the jointer, planing the edge grain of a piece of stock is very easy, provided, of course, that the proper procedure and safety suggestions are followed. In this task package you will gain considerable skill in using the jointer in planing edge grain and should acquire considerable respect and appreciation for this machine. Ready to go? OK. Continue by reading the Objective and doing the Learning Activity and the Learning Practice. Your skill in using the jointer will pay you dividends in your carpentry practice.

OBJECTIVE:

Upon completion of this task package, you will be able to plane stock on the edge, using the jointer to assure a straight, uniform cut at a 90° angle ± 2° to the surface of the wood.

LEARNING ACTIVITY:

1. View sound-slide package #C-III-5.
2. Read Modern Carpentry, page 41, pertaining to the jointer. Study figure 2-37, page 40, which shows the jointer's parts identified. Make a listing of the safety rules and retain for later use.
3. Study the sheet on the jointer, attached to the task package.
4. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

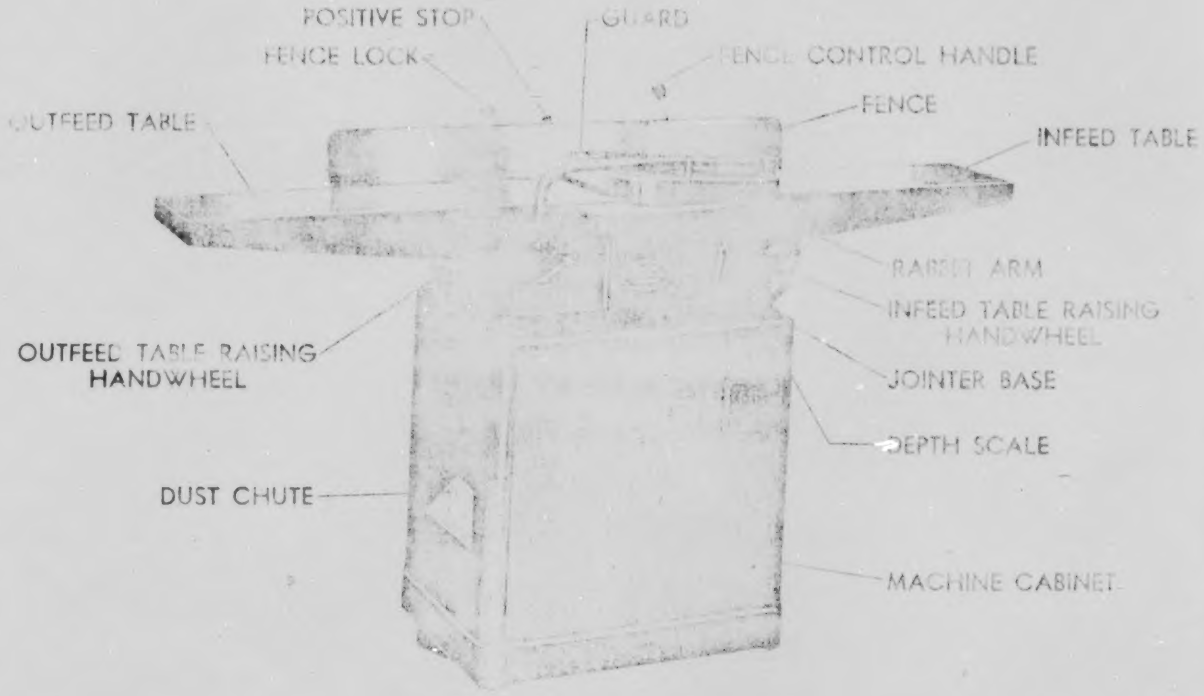
1. Jointer
2. Framing Square
3. Two pieces of stock not less than 12" long

1. Discuss the operating procedure and the safety rules with your instructor.
2. Adjustment and operating procedure of the jointer will be performed in accordance with that outlined in sound-slide package #C-III-5 and in Modern Carpentry, page 41.
3. Select one of the two pieces of wood, noting the grain direction. Stock should be fed into the jointer so that the knives cut with the grain. (See figure 2-38 of Modern Carpentry.)

LEARNING PRACTICE (cont'd):

4. Place a smooth, true face of the board against the fence of the jointer with the edge down on the infeed table. (The fence and table should be at a 90° angle to each other). Check grain direction again.
5. Lower the infeed table for a depth cut of 1/16". Make the edge cut, following the procedure set forth in Modern Carpentry. Check the squareness and trueness of the cut with a framing square. (Be sure to observe the safety rules!)
6. Plane the second edge of the board following the same procedure. Check the accuracy of the cut.
7. With the second piece of wood make an edge cut 3/32" deep. Check your work.
8. On the second edge of this piece of stock make a cut of 1/8". Check for accuracy.
9. If satisfied with your finished exercises, hand them in to your instructor for evaluation.
10. If your work was completed satisfactorily you will be directed to the next task package.
11. Did you know that carpentry is where the action is?

JOINTER


POSITIVE STOP
GUARD
FENCE LOCK
FENCE CONTROL HANDLE
FENCE
OUTFEED TABLE
INFEED TABLE
RABBET ARM
INFEED TABLE RAISING HANDWHEEL
OUTFEED TABLE RAISING HANDWHEEL
JOINTER BASE
DEPTH SCALE
DUST CHUTE
MACHINE CABINET

VITAL SAFETY SUGGESTIONS

- **REMEMBER:** A Jointer is only as safe as its operator. Follow the hints below to prevent any accidents.
- Keep guards in place and use them when practical.
- Avoid using machine tables as work areas or placing metal tools on them while machine is running.
- Do not wear loose sleeves or clothing that might be caught in moving machine parts.
- Keep knives sharpened and properly edged to prevent possible kick-backs.
- Stand clear and out of line with revolving parts when turning on the power, or making heavy cuts.
- Extra caution should be used when working on thin or short pieces. Only very light cuts should be taken and they should be held with a push stick. Use push stick on all cuts when possible.
- Check the depth of cut and the resistance of the knives carefully when making your first cut and after each adjustment of the table.
- Do not "play" around with a running machine.
- Jointer stand should be grounded to water pipe or central grounding system.
- Always disconnect power source when servicing machine.
- Never make machine adjustment when unit is running.
- ALWAYS disconnect power source when servicing machine.
- Machine should be grounded to water pipe or central grounding system.

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UNIT III: WOODWORKING MACHINE TOOLS

TASK PACKAGE # 6: WOOD SHAPER

PREREQUISITES: UNITS I-II; UNIT III, TASK PACKAGES 1-5

RATIONALE:

Probably no machine available can do a better or more complete job of cutting variously shaped moldings on the edges and ends of wood than the wood shaper. Its operation differs from the router (which you have already studied) in that the stock is moved across the knives of the shaper, whereas with the router, the wood remains stationary and this machine is advanced into the stock. Although the shaper is a very versatile machine, you will be expected to cut only a few simple designs on the edge of stock. Ready to begin? All right, continue by reading the Objective and doing the Learning Activity and Learning Practice, referring back to the Objective as often as you feel necessary. Skill with the wood shaper can help you shape a career in carpentry.

OBJECTIVE:

Upon completion of this task package you will be able to use the wood shaper to smooth edges and cut patterns on stock so that the edges are uniformly smooth and true and that the pattern matches the shape specified, deviating no more than 1/32 inch. The stock is to be checked by the instructor against the model provided.

LEARNING ACTIVITY:

1. View slide-sound package # C-III-6.
2. Read and study carefully pages 262 - 273 in Technical Woodworking. Pay close attention to the operating instructions and the safety rules about the wood shaper.
3. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Wood shaper
2. One piece of stock with faces and edges smooth and true
3. Combination square
4. Pencil
5. Model showing 1/4 round and 1/2 round edges

LEARNING PRACTICE (cont'd):

1. Discuss the operation and safety rules for the wood shaper with the instructor.
2. The operations and safety rules as covered in Technical Woodworking will serve as a guide in the completion of the work that is to follow.
3. Select the proper solid three-lip cutter bit to shape the 1/4 round edge. (Compare the bit's shape to the shape on the edge of the model).
4. Install the cutter, adjust the spindle to the correct height, set the fence to the proper width, and adjust the safety hold-down clamp, if available.
5. Make the 1/4 round cut on one edge of stock and compare cut with the model.
6. Following the same procedure, select cutter for 1/2 round edge, adjust spindle to height, fence to width, and hold-down clamp.
7. Shape the second edge of the stock, cutting the 1/2 round edge on it. Check the edge against the model.
8. When you are satisfied you have completed your work correctly, turn it in to your instructor for his evaluation.
9. If your finished job has been done in a satisfactory manner as determined by your instructor, you will be directed to the next task package.
10. Happiness is a job well done.

UNIT III: WOODWORKING MACHINE TOOLS

TASK PACKAGE #7: DRILL PRESS

PREREQUISITES: UNITS I-II; UNIT III, TASK PACKAGES 1 - 6

RATIONALE:

Good morning! This is Station C-III-7 signing on the air!

A woodworking machine that possesses great versatility is the drill press. One can perform a large number of different operations on this machine when it is equipped with the variety of attachments that are available. Some of the different jobs that can be done on the drill press are routing, mortising, jointing, shaping, sanding and plug cutting. These jobs are in addition to the more common operations of drilling, countersinking, and counterboring. In this task package you will learn how to use the drill press to drill, countersink, and counterbore holes, and to also sand irregular curves. Sounds like fun? It is. So, continue, now by reading the Objective carefully and doing the Learning Activity and Learning Practice. Because of its utility in modern carpentry, you need to know how to use the drill press well.

OBJECTIVE:

Upon completion of this task package you will be able to use the drill press to:

a. drill holes through stock at a specified location and 90° to the surface ±2°.

b. countersink holes into stock so that a specified flat head screw will rest flush with the surface of the wood.

c. counterbore holes in stock to a specified diameter and depth of ±1/32 inch.

d. drum sand an irregular curve so that a smooth surface is produced and a uniform line remains on the stock.

LEARNING ACTIVITY:

1. View slide-sound package #C-III-7 for today's show.
2. Read Fundamentals of Carpentry, Volume 1, pages 63 and 64 on the Drill Press.
3. Study the sheet attached to this task package entitled The Drill Press.
4. Read and study carefully Technical Woodworking, pages 222 - 229 and pages 233 and 234. Pay particular attention to the coverage on drilling, counterboring, and countersinking holes and that section dealing with sanding on the drill press.
5. This completes the Learning Activity; go now to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

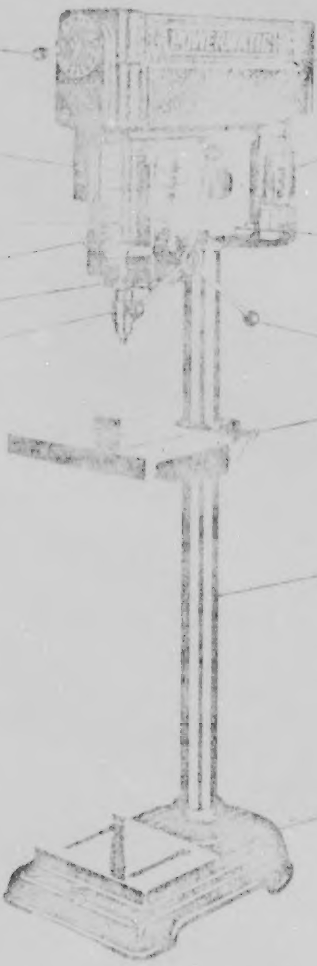
1. Drill press
2. Assortment of twist drill bits
3. Countersink bit
4. Scratch awl
5. Counterbore bit (or large drill bit)
6. Combination square
7. Pencil
8. Sanding drum
9. Two pieces of scrap stock.
10. Piece of stock with "S" curve on it produced in task package #4 of this unit
11. One flat head wood screw

1. Lay out one piece of stock (item #9 above) as follows:
   a. On the face of the piece of wood lay out the centers for 6 holes, widely spread apart. Mark with a "+" mark, using your pencil.
   b. Make a shallow hole at each "+" mark with the scratch awl.
   c. Number the holes 1 through 6 (The order of numberings is unimportant.)
2. Technical Woodworking, pages 222-229 and 233-234, will serve as your guide for the drill press adjustment and the operation procedure.
3. Drill a 1/8" hole through the stock at "+" mark #1. Back up stock with another scrap piece of wood to keep bit from splitting stock on back side. (Be sure to check squareness between bit and table.)

LEARNING PRACTICE (cont'd):

4. Although the drill press is not considered a dangerous machine, don't let happen to you what has happened to those guys in figures #1 and #2.
5. At hole marked #2 drill a 1/4" hole through the wood.
6. Drill a 3/8" hole through the wood at hole #3.
7. At hole #4, drill a 5/8" hole through the stock.
8. Using the counterbore bit, counterbore a hole halfway through your board at location #5. (If no counterbore bit is available, drill a 3/8" hole through and counterbore half the thickness of the stock with a 3/4" bit.)
9. At location #6 drill a hole through the board the size of the shank of the flat head wood screw issued to you. Countersink this hole with the countersink bit so that the head of the screw fits flush with the surface of the board.
10. On the piece of stock with the "S" curve on it, sand the contour with the sanding drum until the curve is smooth.
11. This finishes all the exercises; now evaluate them against the Objective. When you are satisfied that your work is acceptable, turn it in to your instructor.
12. If your work proves to be satisfactory, your instructor will indicate what to do next.
13. This is not exactly Disney World, but it's fun, isn't it?

DRILL PRESS


VARIABLE SPEED CONTROL CAM
GUARD
SWITCH
MOTOR
STOP COLLAR
QUILL LOCK
QUILL YOKE
KEY CHUCK
TURRET HANDLE
TILTING TABLE
COLUMN
BASE

VITAL SAFETY SUGGESTIONS

- Remove or fasten loose articles of clothing, such as necktie, sleeves, coat or jacket, etc.
- Remove jewelry from hands.
- Keep face shield or goggles nearby and use them.
- Always clamp work securely—do NOT hold material with hand while drilling.
- Cut power off machine when servicing machine.
- Use correct size drill and drill speed.
- Properly ground the machine to the water pipe radiator or central grounding system.
- Do not remove metal shavings with hands. Us a long object to keep the table free from shavings.
- ALWAYS disconnect power source when servicing machine.

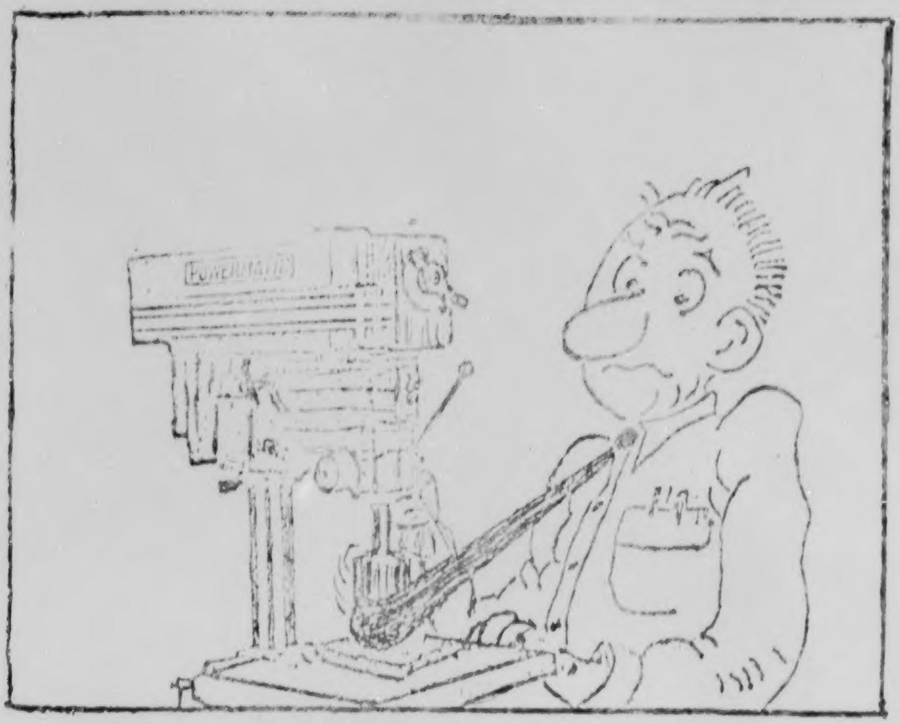

POWERMATIC

Figure 1

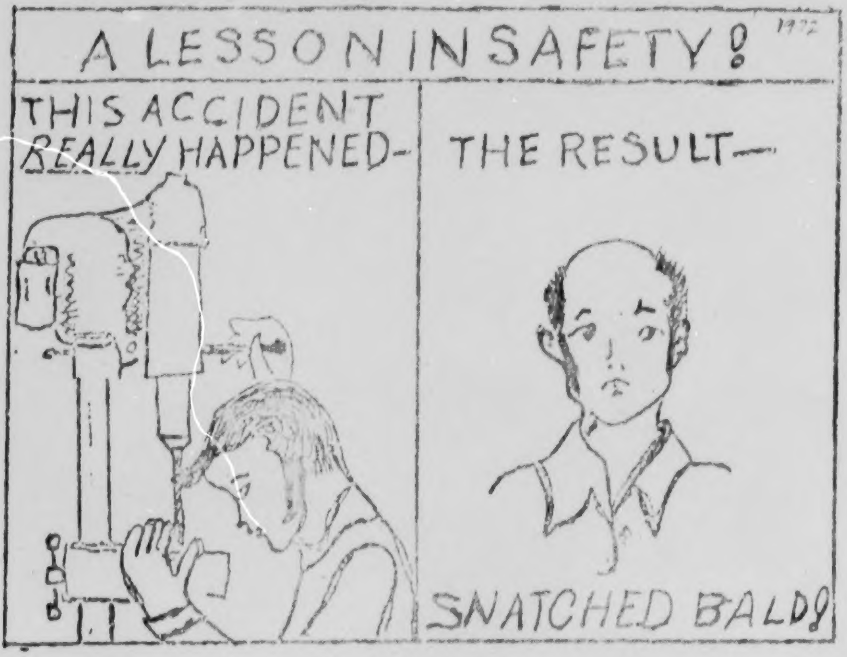
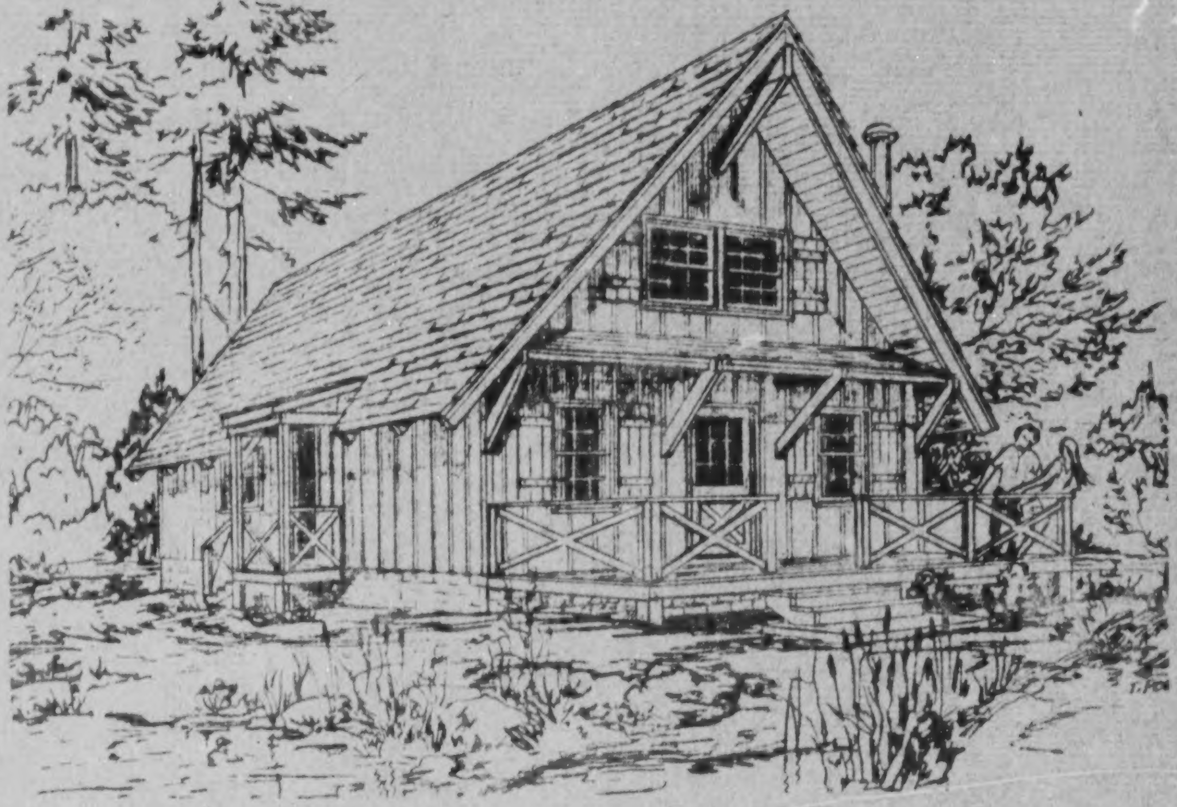

A LESSON IN SAFETY!
1972
THIS ACCIDENT REALLY HAPPENED-
THE RESULT—
SNATCHED BALD!

Figure 2

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330



CLUSTER: CARPENTRY
COURSE: CARPENTRY

C-IV

UNIT PACKAGE IV: LUMBER

PREREQUISITES: UNIT I, TASK PACKAGE 1

RATIONALE:

In his work the carpenter must be able to identify and know the physical properties and grades of construction woods and plywoods. He must determine which woods to use in certain circumstances or which plywoods must be chosen to meet the needs of a certain job. In addition to knowing which woods or plywoods must be used for specific requirements, the carpenter must also be able to figure the amount and cost of lumber or plywood that will be required for a particular job recognizing the difference between normal and actual lumber sizes. If you are to be knowledgeable in the area of carpentry and be able to select the proper lumber for the job, you, too, must learn about construction woods and plywoods. The knowledge that you will gain in this unit will make the remainder of the course much easier and will also allow you to do a much more effective job. Continue, now, by reading the General Objective for the unit and the Specific Objectives for each task package within the unit. This should be followed by reading the Learning Activity, which will give you an insight into what you are to do and how you are to proceed in accomplishing the tasks.

OBJECTIVES:

General:

Upon completion of this unit you will be able to:

know some characteristics of lumber (construction woods and plywoods) and how to figure the amount and cost of the lumber for a specific job.

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Identify samples of construction woods and describe their physical properties. You will be given ten samples (ash, cedar, birch, fir, mahogany, oak, ponderosa pine, yellow pine, redwood, and spruce), and will be required to identify them by name and record in writing their physical properties (color, hardness, and grain). Eight of the ten wood samples must be identified properly and two of the three physical properties for these samples must be given correctly. The instructor will judge your responses, and Wood Identification, beginning opposite page 64 in Modern Carpentry, will serve as the standard.
2. Identify and record in writing varieties (wood type, thickness, number of plies, use and grades of plywood) for the five samples provided by your instructor. You must achieve a minimum of four correct identifications out of a possible five:

OBJECTIVES (cont'd):

a. wood type

b. thickness

c. number of plies

d. use

e. grade

Your performance on this exercise will be judged by your instructor. Material covered from pages 61 through 64 in Modern Carpentry will be used as the standard.

3. Calculate the total board feet and cost for any given amount of lumber, using given formulas for board feet computations. Your performance will be evaluated in accordance with the instructor's checklist.

4. Solve problems which involve computations of measurements expressed in square feet for given amounts of plywood. Your performance will be evaluated in accordance with the instructor's checklist.

5. Record in writing the nominal and actual lumber size of the following lumber stock: 4", 6", 8", 10" and 12" widths by 1" and 2" thickness using a measuring device. Your performance will be evaluated by a test to be measured in accordance with the instructor's checklist.

OBJECTIVES (cont'd):

6. Identify orally the lumber grades (#1 common, #2 common, #3 common, #4 common) and at least three different kinds of defects which affect the grade of selected lumber samples. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on lumber consists of six task packages which should be completed in numerical order. However, you will also note that only the first task package of Unit I is necessary prior to your beginning this unit. As you complete each task package in this unit you will view a sound-slide package, do reading, answer questions, perform calculations, and complete other activities as directed:

The titles of the task packages within this unit are:

TASK PACKAGE 1: CONSTRUCTION WOODS
TASK PACKAGE 2: PLYWOOD
TASK PACKAGE 3: BOARD FEET CALCULATIONS
TASK PACKAGE 4: SQUARE FEET CALCULATIONS
TASK PACKAGE 5: LUMBER SIZES
TASK PACKAGE 6: GRADES OF LUMBER

LEARNING ACTIVITY (cont'd):

If at this time you feel confident that you can pass a comprehensive test covering information contained in this unit you should report to the instructor for the examination. If you do not feel ready to be examined, at this time, you should begin work on the task packages as indicated.

UNIT IV: LUMBER

TASK PACKAGE #1: CONSTRUCTION WOODS

PREREQUISITES: UNIT I, TASK PACKAGE #1

RATIONALE:

In his work the carpenter must be able to identify and know the physical properties of construction woods. He must determine which woods to use in certain circumstances; for example, the hardness of the wood may have a definite bearing upon its being used or not being selected for a certain purpose. Consider the difficulty of nailing in using a real hardwood. In another case, the color of the wood may be the determining factor. If the wood has pleasing color it will be selected; if not, it will not be considered. In this task package you will learn to identify samples of construction woods and also be able to identify their physical properties. Continue by reading the Objective and doing the Learning Activity and the Learning Practice, referring back to your Objective as often as necessary so you will know when you have reached your goal.

Remember: Knowledge of construction woods is basic and essential to good carpentry.

OBJECTIVE:

Upon completion of this task package you will be able to identify samples of construction woods and describe their physical properties. You will be given ten samples (ash, cedar, birch, fir, mahogany, oak, ponderosa pine, yellow pine, redwood, and spruce), and will be required to identify them by name and record in writing their physical properties (color, hardness, and grain). Eight of the ten wood samples must be identified properly, and two of the three physical properties for these samples must be given correctly. The instructor will judge your responses, and Wood Identification, beginning opposite page 64 in Modern Carpentry, will serve as the standard.

LEARNING ACTIVITY:

1. View sound-slide package #
2. Read and study carefully Modern Carpentry, Wood Identification, beginning opposite page 64.
3. Make a list of the woods that you have seen before. Compare this list with the list of woods included in the Objective. How many do you have to learn?
4. This completes your Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Wood samples for identification purposes

1. Take the wood samples and spread them out in front of you so that they are all visible.
2. Study each sample carefully noting such things as its color, hardness, and grain pattern. (Pick up the samples and examine them carefully, noting any distinguishing features.)
3. Compare the samples with the illustrations of wood in *Modern Carpentry*.
4. Write the name of each of the wood samples and record for each sample the three physical properties; that is, its color, hardness, and grain pattern. (Hardness may be determined by trying to scratch the sample with the finger nail; grain, pattern and color by observation.)
5. When you feel that you can recognize each of the samples and know their three physical properties, report to your instructor for the evaluation.
6. When you have satisfied the requirements of the *Objective* as determined by your instructor, you will be directed to the next task package.
7. How much wood would a woodchuck chuck if a woodchuck could chuck wood?

UNIT IV: LUMBER

TASK PACKAGE 2: PLYWOOD

PREREQUISITES: UNIT I, TASK PACKAGE I; UNIT IV, TASK PACKAGE I

RATIONALE:

In the process of building, the carpenter uses plywood to an ever increasing extent. Some examples are for foundation forms, sub floors, cabinets, outside wall sheathing, and roof sheathing. Therefore, you see the carpenter must have considerable knowledge of the varieties and kinds of plywood available. In this task package you will be given the opportunity to examine various samples of plywood and learn how to identify them according to wood type, thickness, number of plies, use, and grade. Plywood is used in a variety of ways, and your skill in employing this versatile construction material will make you a more efficient and better-paid carpenter. Continue by reading the Objective and doing the Learning Activity and Learning Practice, referring to the Objective as often as you feel necessary.

OBJECTIVE:

Upon completion of this task package you will be able to identify and record in writing varieties (wood type, thickness, number of plies, use and grades of plywood) for the five samples provided by your instructor. You must achieve a minimum of four correct identifications out of a possible five:

a. wood type

b. thickness

c. number of plies

d. use

e. grade

Your performance on this exercise will be judged by your instructor. Material covered from pages 61 through 64 in Modern Carpentry will be used as the standard.

LEARNING ACTIVITY:

1. View sound-slide package #
2. Study carefully pages 61-64 in Modern Carpentry, noting particularly such things as wood type, thickness, number of plies, use, and grade of the plywood.
3. This completes the Learning Activity; begin now on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Various samples of plywood including those with different wood type, thickness, numbers of plies, and grade.
2. Folding wood rule.

1. Secure from your instructor various samples of plywood and arrange them on a table in front of you.
2. Modern Carpentry, pages 61 -64, will serve as the guide in determining the various characteristics of the plywood.
3. Examine each sample to determine its wood type, thickness, number of plies, and grade. (The use of the plywood depends on the other four characteristics.)
4. For each of the samples write down its wood type, thickness, number of plies, use, and grade.
5. When you feel that you know about the plywood samples report to your instructor.
6. Your knowledge of plywood will be evaluated according to the standards in the Objective and as judged by your instructor.
7. When you have satisfactorily completed this task package, you will be directed to the next one.
8. Ply on to the next task package.

C-IV-3

UNIT IV: LUMBER

TASK PACKAGE #3: BOARD FEET CALCULATIONS

PREREQUISITES: UNIT I, TASK PACKAGE 1; UNIT IV, TASK PACKAGES 1 - 2

RATIONALE:

In order for a carpenter to know how much lumber he will need for a given house and what the cost will be, he needs to know how to figure board feet.

Also, if you are in the contracting business and must submit a bid for the amount of money it would take to construct the house, you would have to know how to calculate board feet. One can readily see the importance of board feet calculation. Therefore, in this task package you will be expected to learn how to use formulas for figuring the total board feet and/or the cost of a given amount of lumber. Continue, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to calculate the total board feet and cost for any given amount of lumber, using formulas for board feet computations. Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #
2. Do you know how to figure board feet? Check for yourself by taking the pre-test of package 24, Lumber Measure, in the *Mathematics for Vocations* series. If you had trouble on this test perhaps you should study the entire package.
3. Do you know how to multiply and divide fractions? If you feel uncertain of yourself refer to *Mathematics for Vocations*, packages #3 and #5.
4. Study *Modern Carpentry*, page 61, the section entitled Figuring Board Footage.
5. This completes the *Learning Activity*; begin the *Learning Practice*.

LEARNING PRACTICE:

Tools and Equipment

1. Several pieces of lumber of varying thickness, width, and length.
2. Folding wood rule
3. Paper and pencil

1. The term board foot means a board that is 1" thick, 12" wide, and 12" long. This measure is considered as 144 square inches, as well as 1 board foot. To figure board feet use one of the two formulas that apply:

LEARNING PRACTICE (cont'd):

$$\frac{\text{No. pc. xT" xW' xL"}}{144} = \text{B.F.} \qquad \frac{\text{No. pc. xT" xW' xL'}}{12} = \text{B.F.}$$

(No. pc. = number pieces, T = Thickness in inches, w = width in inches of wood, L = length in inches or feet as given, B.F. = Board Feet) Note: If length is given in inches divide by 144; if length is given in feet divide by 12.

Note: The total cost may be computed by multiplying the total number of board feet by the cost per 1000 B.F., 100 B.F., or 1 B.F. as the case may be.

2. On your paper compute the following:
   a. 50 boards 2" x 6" x 16' = ____________ Board Feet
   b. 80 boards 1" x 8" x 18' = ____________ Board Feet
   c. 3 boards 1" x 8' x 18" = ____________ Board Feet
3. Calculate the cost of six pieces of 2" x 4" x 14' lumber that sells for $105.00 per M (thousand board feet.) $____________
4. If you pay $ .12 per board foot for 1" x 8" lumber, how much will 50 pieces, 12' in length cost you? $____________
5. On the piece of lumber marked #1, measure its size with the folding wood rule, calculate the board feet and the total cost if the cost per board foot is $ .36 B.F. _______ Total Cost $ __________
6. Measure and calculate the number of board feet and total cost of board marked #2 and #3. If the cost per board foot is $ .36 B.F._______ Total Cost $__________

LEARNING PRACTICE (cont'd):

7. Take all the boards issued to you, measure them, then calculate the total board feet for the group. At $ .30 per 100 board feet, figure the total cost of the boards.

   B.F. __________ Total Cost $__________

8. Check with your instructor for his evaluation of your work.
9. When the determination is made that you are ready to be examined on board feet problems, proceed with the test the instructor will administer.
10. After you have completed the examination satisfactorily you will be directed to the next package.
11. Congratulations! You may certainly be proud of your accomplishments!

UNIT IV: LUMBER

TASK PACKAGE #4: SQUARE-FEET CALCULATIONS

PREREQUISITES: UNIT I, TASK PACKAGE 1; UNIT IV, TASK PACKAGES 1 - 3

RATIONALE:

In addition to having to calculate board feet and the cost of lumber, the carpenter also finds it necessary to be able to figure the square footage of plywood and its cost. The ability to compute board feet, square feet, and the resulting cost is particularly important if the carpenter is also a contractor who must submit a bid for a particular job. What if you were asked to figure the amount of square feet of plywood needed to build a house? Could you do it? In this task package you can find out how to compute the square footage for a given amount of plywood and figure the cost involved. Continue by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to solve problems which involve computations of measurements expressed in square feet for given amounts of plywood. Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #
2. Review Vocational Mathematics, Package #3, Multiplying Fractions; Package #5, Division of Fractions; and Package #24, Lumber Measure, if you feel the need to refresh yourself on these mathematical skills.
3. Study the information and formulas given below. This material should assist you very much in your computation of square footage and the cost involved.

   No. pc. x L' x W' = S. F.

   No. pc. - means number of pieces; L' - is length in feet; W' - is width in feet; and S. F. - means square feet.

   NOTE: A sheet of plywood is generally 4' wide x 8' long; therefore, to compute the number of sheets needed you would use the following formula:

$$\frac{\text{Square feet}}{32} = \text{number sheets}$$

OBJECTIVE:

Upon completion of this task package you will be able to record in writing, the nominal and actual lumber size of the following lumber stock; 4", 6", 8", 10" and 12" widths by 1" and 2" thicknesses, using a measuring device. Your performance will be evaluated by a test to be measured in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. Today's show is sound-slide package #
2. Read Modern Carpentry, page 61, the section entitled Lumber Sizes. Study figures 4-18 page 59 and figures 4-19 page 60.
3. This completes the Learning Activity; begin the Learning Practice,

LEARNING PRACTICE

Tools and Equipment

1. Lumber of 1" and 2" thicknesses;
   6", 8", 10", and 12" widths
2. Folding wood rule

C-IV-5

UNIT IV: LUMBER

TASK PACKAGE #5: LUMBER SIZES

PREREQUISITES: UNIT I, TASK PACKAGE #1; UNIT IV, TASK PACKAGES #1-4

RATIONALE:

You know that some clothes may shrink under certain conditions. Did you know that lumber shrinks in size due to seasoning and surfacing?

If your instructor sent you to get a board 2" x 12" x 12' long, do you know what the actual thickness, width, and length would be? You say 2" x 12" x 12'; right? Well, not exactly. You see, when listing and calculating the size and amount of lumber, the nominal dimension (rough unfinished measurement) is always used. But the actual size is the dressed size and is less than the nominal size as a result of seasoning and surfacing. The carpenter must know the actual size of lumber if he is to be able to construct a house and not make serious errors where size of the wood is concerned. In this task package you will be given the opportunity to check nominal and actual lumber sizes by examining samples of stock.

Continue by reading the Objective and doing the Learning Activity and Learning Practice.

LEARNING PRACTICE (cont'd):

7. When you have completed satisfactorily his evaluation you will be directed to the next task package.
8. Wouldn't you like to have a nickel for every learning practice?

LEARNING PRACTICE:

Tools and Equipment

1. Sample pieces of plywood
2. Folding wood rule
3. Pencil
4. Paper

1. Using the formulas and information contained in the Learning Activity, calculate the following problems:

2.

Dimensions	Square-Feet	Number of Sheets
a. 24' x 30' =	________ square feet	________________
b. 18' x 16' =	________ square feet	________________
c. 36" x 64" =	________ square feet	________________

3. How many square feet of plywood are needed to construct a wall 8' high and 44' wide? ________________square feet.

4. How many sheets of plywood are needed to cover a roof that measures 1,400 square feet in area? ___________sheets.

5. Measure all the sample pieces of plywood provided by your instructor. Calculate the total number of square feet of all the samples. Total square feet ______________.How many 4' x 8' sheets would this amount make?______________sheets. If the cost were $3.52 per sheet, what would be the total cost of the samples? __________________total cost.

6. When you have answered #2 through #5, report to your instructor for his evaluation.

LEARNING PRACTICE (cont'd):

1. Secure the lumber samples from your instructor, separating them into two groups; those that are 1" thick and those that are 2" thick.
2. Select the 1" thick, 6" wide board. Measure its actual thickness and width with a folding wood rule. Record these dimensions in writing on a sheet of paper.
3. Next, measure the 1" x 8" board and record your findings.
4. In succession measure and record the 1" x 10" and 1" x 12" boards.
5. Likewise, measure and record the actual measurements for the 2" x 6", 2" x 8", 2" x 10" and 2" x 12" boards.
6. Check your answers with the chart entitled Standard Sizes of Lumber, page 456 in *Modern Carpentry*.
7. When you have completed your measurements turn in the finished job to your instructor.
8. If you have satisfactorily completed the Objective you will be directed to the next task package.
9. The actual size of your accomplishment on this task package was much more than nominal.

C-IV-6

UNIT IV: LUMBER

TASK PACKAGE # 6: GRADES OF LUMBER

PREREQUISITES: UNIT I, TASK PACKAGE #1; UNIT IV, TASK PACKAGES #1-5

RATIONALE:

News flash -- different types of lumber, as well as high school students, have different grades. Not report-card grades, mind you, but lumber grades. Come on, now, and make the grade with this task package.

The carpenter must understand that quality construction does not always require that all lumber be of the best grade. Today, lumber is graded for specific uses and, in a given structure, several grades may be appropriate. The key to good economical construction is the proper use of the lowest grade which is suitable for the purpose, but you should always strive to make the highest grade on your report card. In this task package you will learn to recognize common grades of lumber and the defects that affect the lumber grades. Continue now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to identify orally the lumber grades (#1 common, #2 common, #3 common, #4 common) and at least three different kinds of defects which affect the grade of selected lumber samples. Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #
2. Read Modern Carpentry, pages 57 and 58; the sections entitled Lumber Defects and Grades (Softwoods). Study figure 4-17 Softwood Lumber Classifications and Grades on page 59.
3. Read and study pages 113-121 up to Factory or Shop Lumber in the reference Fundamentals of Carpentry, Volume I. In performing your Learning Practice later, refer to Table III on page 120 in this reference.
4. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Lumber samples from the four different grades. Samples should contain various defects which affect the grade.

LEARNING PRACTICE (cont'd):

1. Your instructor will provide you with several lumber samples representing the four different grades (#1, #2, #3, and #4 common). The samples will contain various defects which affect the grade. (Check Modern Carpentry, pages 57-58, for Lumber Defects.)
2. Study the samples carefully, considering the defects. Compare the samples and the defects against the data presented in Table III, page 120 of Fundamentals of Carpentry, Volume I.
3. When you feel that you know the lumber grades and the defects, report to your instructor.
4. Your instructor will ask you to orally identify certain lumber grades and defects.
5. When you have demonstrated satisfactorily knowledge in this area, you will be directed to the next task package.
6. Your accomplishment was uncommon and your defects were few.

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
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CLUSTER: CARPENTRY
COURSE: CARPENTRY

CE003939 (e)

UNIT PACKAGE V: FASTENERS AND ADHESIVES

PREREQUISITES: UNIT I

RATIONALE:

It is very doubtful that a day passes that the carpenter does not use some type of fasteners or adhesives. In the category of fasteners, nails, wood screws, metal screws, machine screws, bolts, and anchors, are items the carpenter employees. He also finds uses for various types of glues and mastics. In order for the carpenter to select fasteners wisely and for the purpose for which they were intended he must be able to identify them according to their type, size, and use. Similarly he must be able to select the proper glue or mastic in order that he perform the best job possible. Likewise, in this unit it is your responsbility to become acquainted with various types of fasteners and adhesives so that you may become more proficient in your work later in the course. Continue, now, by reading the General Objective for the unit and the Specific Objectives for each task package within the unit. Proceed, then, to the Learning Activity, which states what it is that you are to do and how you are to go about completing the tasks.

OBJECTIVES:

General:

Upon completion of this unit you will be able to identify and know the uses of fasteners; also, know and apply glue and mastics.

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Identify in writing, from an assortment of fasteners, nails and wood screws according to their type, size, and use. Reference and measuring devices may be used. Your performance will be evaluated by a written test and measured in accordance with the instructor's checklist.
2. Using an assortment of common fasteners found in building construction, perform the following:
    a. identify fasteners in writing as to the following classifications; metal screws, machine screws, bolts, and anchors.
    b. state in writing one use for each type of fastener.
    c. state in writing four types of heads used in the design of fasteners.

    Your performance will be evaluated in accordance with the instructor's checklist.
3. Identify orally and use glue and mastics provided by your instructor to cement stock or to attach laminated tops onto a cabinet so

OBJECTIVES (cont'd):

that a permanent bond is accomplished and the adhesive is applied in accordance with the standards in unit 18 of Modern Carpentry, as judged by your instructor.

LEARNING ACTIVITY:

This unit on Fasteners and Adhesives is composed of three task packages which should be completed in order. You will note, however, that only Unit I is necessary prior to doing this unit. As you complete each task package in this unit you will view a sound-slide package, do readings, answer questions, and perform other activities as directed. The titles of the task packages with this unit are:

TASK PACKAGE 1: NAILS AND WOOD SCREWS

TASK PACKAGE 2: FASTENERS FOR METAL, CONCRETE, AND MASONRY

TASK PACKAGE 3: GLUE AND MASTICS

If at this time you feel ready to pass a comprehensive test over the material in this unit, contact the instructor for the administration of the examination. If you are not now ready to be examined, begin work on the task packages as indicated above.

UNIT V: FASTENERS AND ADHESIVES

TASK PACKAGE I: NAILS AND WOOD SCREWS

PREREQUISITES: UNIT I; TASK PACKAGES 1, 14, 15

RATIONALE:

News flash - nails and screws are still helping to hold the world together. And the long-range forecast is that they will continue to help keep things held together. So don't hold your breath with this task package, but get on with these holding devices.

As a carpenter, you will use nails every day on your job. Also, there are numerous occasions when you will have to depend on screws as fasteners. In order to use nails and screws wisely and for the purposes for which they were intended, the carpenter must be able to identify them according to their type, size, and use. In this task package you will be given the opportunity to develop some skill in the identification of nails and wood screws by their type, size, and use. You will be given several samples of nails and screws which you can handle, measure, and compare with illustrations in order to classify them. Continue, then, by reading the Objective and doing the Learning Activity and Learning Practice. Remember a carpenter that cannot identify the proper nails and screws is as handicapped as a ball player who doesn't know the rules of the game.

OBJECTIVE:

Upon completion of this task package you will be able to identify in writing, from an assortment of fasteners, nails and wood screws according to their type, size and use. References and measuring devices may be used. Your performance will be evaluated by a written test and measured in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. Today's show is slide-sound package #
2. Read and study Modern Carpentry, pages 67 - 68, the section entitled Metal Fasteners.
3. Read Fundamentals of Carpentry, Volume I, pages 183 - 193, about nails. Also read and study carefully pages 193 - 195 concerning wood screws.
4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. An assortment of nails and wood screws
2. Combination square

LEARNING PRACTICE (cont'd):

1. Written material, charts, and illustrations found in Modern Carpentry, pages 67 - 68, and Fundamentals of Carpentry, Volume I, pages 183 - 195, will serve as the standards to use in the classification of nails according to their type, size and use.
2. You will be issued two groups of wood fasteners, one group of nails, and one group of wood screws.
3. In the group of nails you will find all the types, many of the sizes, and several nails for special use. Each nail should be identified according to its type, size, and use (employ your references and combination square.)
4. Within the group of screws will be found wood screws of various types, many sizes, and some screws for special use. Identify each screw according to its type, size, and use. (Refer to your references again and use the combination square for measuring.)
5. When you are confident you can identify nails and wood screws, report to your instructor for his evaluation.
6. You will be given a written test so that you may demonstrate your ability to identify both nails and wood screws according to type, size, and use. (References and measuring devices may be used.)
7. When you have satisfactorily completed this exercise you will be directed to the next task package.
8. Task packages make the world go round; nails and screws just hold it down.

UNIT V: FASTENERS AND ADHESIVES

TASK PACKAGE 2: FASTENERS FOR METAL, CONCRETE, AND MASONRY

PREREQUISITES: UNIT I, TASK PACKAGE 1; UNIT V, TASK PACKAGE 1

RATIONALE:

Fasten your seat belt and let's ride through the world of fasteners. Just adhere to your seat while you fasten your attention on this task package.

Quite often in his work the carpenter will have need to make use of metal screws, machine screws, bolts, and anchors. He should be able to recognize them by their appearance as well as know their use, head type, size, and many other factors about them. In this task package you will be given the opportunity to familiarize yourself with metal screws, machine screws, bolts, and anchors and some of their characteristics. Continue by reading the Objective and doing the Learning Activity and the Learning Practice. Carpenters have found, as you will find, that without fasteners their houses would self destruct.

OBJECTIVE:

Upon completion of this task package you will be able to, using an assortment of common fasteners found in building construction, perform the following:

a. identify fasteners in writing as to the following classifications; metal screws, machine screws, bolts, and anchors.

b. state in writing one use for each type of fastener.

c. state in writing 4 types of heads used in the design of fasteners.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. Today's show is slide-sound package #
2. Read and study Fundamentals of Carpentry, Volume I, pages 196-202 down to "Metal Wood Connectors."
3, This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. An assortment of metal screws, machine screws, bolts, and anchors.
2. Folding wood rule.

LEARNING PRACTICE (cont'd):

1. Your instructor will give you an assortment of metal screws, machine screws, bolts, and anchors for you to identify according to type, use, and head shape.
2. Separate the fasteners into their respective four groups; that is, metal screws, machine screws, bolts, and anchors. (Use Fundamentals of Carpentry, Volume I,as an aid in doing this.)
3. Taking each group in succession, determine two things about each fastener in each group. List on a sheet of paper the type of fastener, then the shape of the fastener head, and state one use for each fastener. (Do this for every fastener you were issued.)
4. When you are satisfied you can identify the fasteners according to type, head shape, and use, report to your instructor.
5. Your instructor will ask you to demonstrate your mastery of the fasteners covered in this task package.
6. When satisfied with your accomplishment your instructor will direct you to the next task package.
7. Congratulations! You did well on this task package; see if you can do equally well on the next one.

C-V-3

UNIT V: FASTENERS AND ADHESIVES

TASK PACKAGE #3: GLUE AND MASTICS

PREREQUISITES: UNIT V, TASK PACKAGES 1 - 2

RATIONALE:

Don't become unglued over this task package. The knowledge it contains will help you stay glued together as a good carpenter. It's a practical necessity for a carpenter to be familiar with the properties and uses of adhesives.

The adhesives the carpenter uses may be classified as glue and mastics. Research and development have created many new products in this area; some are highly specialized and designed for a specific material and/or application procedure. It is, therefore, necessary for the carpenter to endeavor to keep acquainted with new developments as these innovations may make his work easier and the finished product (the structure) better. In this task package you will be given the opportunity to learn to identify and use some samples of glues and mastics. Proceed by reading the Objective and doing the Learning Activity and the Learning Practice. If you don't become stuck in this task package, you will be able to move into a new unit.

OBJECTIVE:

Upon completion of this task package you will be able to identify orally and use glue and mastics provided by your instructor to cement stock or to attach laminated tops onto a cabinet so that a permanent bond is accomplished and the adhesive is applied in accordance with the standards in Unit 18 of Modern Carpentry, as judged by your instructor.

LEARNING ACTIVITY:

1. View sound-slide package #
2. Read Modern Carpentry, pages 68 - 69, the section entitled Adhesives and Mastics.
3. Read Fundamentals of Carpentry, Volume I, pages 212-214 the section entitled Glue.
4. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Samples of various types of glue
2. Samples of several mastics
3. Scraps of wood stock for gluing
4. Small samples of lamination for cabinet tops
5. Other types of material for attaching with mastics

LEARNING PRACTICE (cont'd):

1. Your instructor will issue you the glues, mastics, wood and other materials, and lamination materials as described above.
2. Observe the demonstration given by the instructor on the proper methods for gluing and clamping stock and for laminating cabinet tops. He will also demonstrate how to apply mastics and attach appropriate materials to the mastics.
3. Study the glue issued to you; identify the different kinds by a comparison with material discussed in Modern Carpentry, pages 68 - 69 and Fundamentals of Carpentry, Volume I, pages 212 - 214.
4. Following the same procedure identify the mastics issued to you using Modern Carpentry, page 69, as your guide.
5. Following correct gluing procedures as demonstrated by your instructor, glue several pieces of stock together using all the kinds of glue issued to you. Also attach the laminations to the wood stock.
6. Following correct application procedures, as shown to you by your instructor, attach several pieces of stock together using all of the mastics provided.
7. When you feel you can identify and use glue and mastics correctly report to your instructor.
8. When you have demonstrated you have mastered the material covered in this task package you will be directed to the next unit.
9. Glad you didn't get stuck on this task package. It wasn't so sticky after all.

RESEARCH PROJECT

SANFORD CENTRAL HIGH SCHOOL
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CLUSTER: CARPENTRY

COURSE: CARPENTRY

CE003932(A)

UNIT PACKAGE VI: PLANS, SPECIFICATIONS, AND CODES FOR HOUSES

PREREQUISITES: UNIT I, TASK PACKAGE 1; UNIT IV; UNIT V, TASK PACKAGES 1-2

RATIONALE:

Because the carpenter must use plans and specifications in the building of a home and also follow building codes, it is necessary for him to be able to read and interpret home building plans and specifications and be familiar with local building codes. He gains this information by reading drawings called blueprints which use a system of symbols that provide him with instructions necessary to accomplish his work. The carpenter's ability to interpret these building plans and specifications will directly affect the speed and accuracy of completing his construction jobs. Therefore, you will be expected to learn how to read and interpret plans and specifications for a home by having experiences in the actual reading and interpreting of residential plans and specifications. Continue, by reading the General Objective for the unit and the Specific Objectives for each task package within the unit. Proceed, then, by reading the Learning Activity, which explains what you are to do in this unit and how you are to go about performing the tasks.

OBJECTIVES.

General:

Upon completion of this unit you will be able to identify architectural lines, symbols, abbreviations, and structural components appearing on a plan of a residential structure.

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Using the floor plan of a house provided by the instructor, you will be able to perform the following:
    a. identify orally the architectural lines.
    b. identify orally the architectural symbols.
    c. identify orally the architectural abbreviations.

    Your performance will be evaluated in accordance with the instructor's checklist.

2. Using the elevations and a typical wall section of a house provided by the instructor, perform the following:
    a. identify orally exterior structural components appearing on the elevations of a house.
    b. identify orally structural components in a typical wall section.

    Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on Plans, Specifications, and Codes For Houses consists of two task packages which should be completed in order. You should take note of the prerequisites necessary prior to beginning work on this unit. As you complete each package in this unit you will read, answer questions, and perform other activities as requested. The titles of the task packages constituting this unit are:

TASK PACKAGE 1: ARCHITECTURAL LINES, SYMBOLS, AND ABBREVIATIONS

TASK PACKAGE 2: RESIDENTIAL BUILDING CONSTRUCTION PLANS AND SCHEDULES

If at this time you feel confident that you can pass a comprehensive examination covering the material included in this unit, contact the instructor for the administration of the test. If, however, you do not feel properly prepared to be tested, begin work on the task packages as indicated above.

UNIT VI: PLANS, SPECIFICATIONS, AND CODES FOR HOUSES

TASK PACKAGE 1: ARCHITECTURAL LINES, SYMBOLS, AND ABBREVIATIONS

PREREQUISITES: UNIT I, TASK PACKAGE 1; UNIT IV, TASK PACKAGES 1-6;
UNIT V, TASK PACKAGES 1 AND 2

RATIONALE:

Signs and symbols play an important part in our lives. Some people are turned on by horoscope symbols. Others are concerned with different symbols related to their specialized interests and activities. The good carpenter enjoys reading and interpreting symbols on blueprints. So get into this task package, for your horoscope symbol says this is your lucky day!

Since the carpenter must use plans and specifications in the construction of a home and also adhere to building codes, it is necessary for him to have the ability to read and interpret home building plans and specifications and be familiar with local building codes. He gains this information by reading drawings called blueprints which use a system of symbols that provide him with instructions necessary to accomplish the work to be completed. The carpenter must have a working knowledge of this system of symbols if he is to read and interpret the drawings. In this task package you will be given experience in identifying line types and uses, symbols, and abbreviations which are commonly used in blueprints.

RATIONALE (cont'd):

Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to, using the floor plan of a house provided by the instructor, perform the following:

a. identify orally the architectural lines.

b. identify orally the architectural symbols.

c. identify orally the architectural abbreviations.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View slide-sound package #
2. Read Modern Carpentry, pages 71-86. Study particularly the symbols given in figure 5-16, page 80; figure 5-18, page 82; and figure 5-19, page 83.
3. Study page 455 in Modern Carpentry which shows abbreviations commonly used in building construction.
4. Refer to the attached sheet on the Alphabet of lines.

LEARNING ACTIVITY (cont'd):

5. Read Chapter IX, Blueprint Reading, pages 229-243 in Fundamentals of Carpentry, Volume I.
6. Your instructor will give you additional reference material and instructions which will help you understand lines, symbols, and abbreviations.
7. This completes the Learning Activity; begin the Learning Practice.

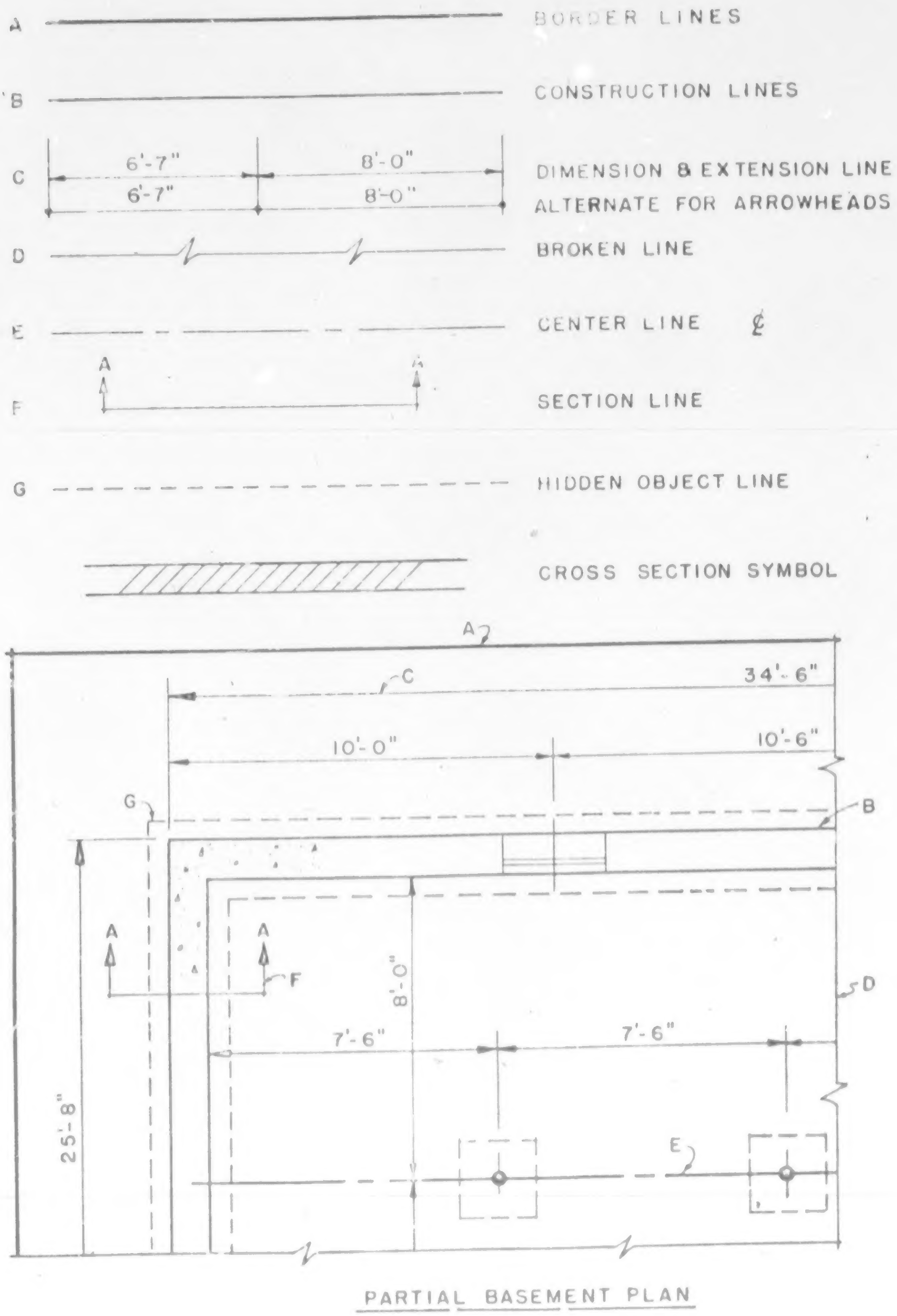
LEARNING PRACTICE:

1. Report to your instructor and he will issue you a floor plan for a rectangular shaped house.
2. Your instructor will also issue you additional reference material and give you instructions as to how you are to use this material.
3. Using the floor plan issued to you, make an itemized listing and/or sketch on a sheet of paper of all the architectural lines, symbols, and abbreviations found.
4. Compare this listing and/or sketches prepared in #3 above with lines, symbols and abbreviations covered in Modern Carpentry, pages 71-86, and to the sheet on the Alphabet of Lines, included with this task package. Also compare this listing with material covered in Chapter IX, pages 229-243, in Fundamentals of Carpentry.

LEARNING PRACTICE (cont'd):

Volume 1.

5. After making the comparison referred to in #4 above, on your sheet beside the listing and/or sketch write in the correct name of the line, symbol, or abbreviation.
6. If you encountered trouble in understanding any of the lines, symbols, or abbreviations you may seek clarification from persons knowledgeable in reading a floor plan.
7. When you are satisfied that you have identified correctly all of the architectural lines, symbols, and abbreviations on the floor plan, report to your instructor for evaluation.
8. You will be asked to identify orally certain lines, symbols, and abbreviations on the house plan and when you have responded in a satisfactory manner, you will be directed to the next task package.
9. It takes a little yeast to make the dough rise; it takes a little work to make the dough.


A
BORDER LINES
B
CONSTRUCTION LINES
C
6'-7"
8'-0"
DIMENSION & EXTENSION LINE
6'-7"
8'-0"
ALTERNATE FOR ARROWHEADS
D
BROKEN LINE
E
CENTER LINE ℄
F
A
A
SECTION LINE
G
HIDDEN OBJECT LINE
CROSS SECTION SYMBOL
A
C
34'-6"
10'-0"
10'-6"
G
B
A
A
F
8'-0"
D
7'-6"
7'-6"
25'-8"
E
PARTIAL BASEMENT PLAN

Alphabet of lines.

UNIT VI: PLANS, SPECIFICATIONS, AND CODES FOR HOUSES

TASK PACKAGE 2: RESIDENTIAL BUILDING CONSTRUCTION PLANS AND SCHEDULES

PREREQUISITES: UNIT I, TASK PACKAGE 1; UNIT IV, TASK PACKAGES 1-6;
UNIT V, TASK PACKAGES 1 & 2; UNIT VI, TASK PACKAGE 1.

RATIONALE:

Speed and accuracy, in any activity, result from planning ahead. In carpentry, planning ahead depends on the skill of interpreting construction details and schedules. You will increase your efficiency and speed in these areas with practice. So go get'em, Speedy!

The carpenter's ability to interpret plans and schedules will directly affect the speed and accuracy of completing construction jobs. This task package is designed to provide you with practical experiences in reading and interpreting plans and schedules which will enable you to use these skillfully to complete actual jobs. Continue, now, by reading the Objective and performing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to, using the elevations and a typical wall section of a house provided by the instructor,perform the following:

a. identify orally exterior structural components appearing on the elevations of a house.

b. identify orally structural components in a typical wall section.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package
2. Read Modern Carpentry, pages 71-86. Study particularly those sections dealing with elevations and wall sections.
3. Read Fundamentals of Carpentry, Volume 1, Chapter IX, Blueprint Reading, pages 229-243. Note especially those sections dealing with elevations and wall sections.
4. Your instructor will give you additional reference material and instructions which will help you understand elevations and wall sections.
5. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Elevations and typical wall section for a house.

1. Report to your instructor, who will issue you plans containing elevations and a typical wall section for a rectangular shaped house.
2. Your instructor will also issue you additional reference material and give you instructions as to how you are to use this material.
3. Using the plans of the elevations and typical wall section issued to you, note carefully the exterior structural components on the elevation views and the structural components in the typical wall section.
4. Compare these components (item 3 above) with elevation views and wall sections as illustrated in Modern Carpentry, pages 71-86, and in Fundamentals of Carpentry, Volume 1, pages 229-243.
5. After making the comparison (item 4 above) identify each of the structural components appearing on the elevation views and the typical wall section.
6. If in identifying any of the structural components you encountered difficulty and need clarification, you may seek help from any person knowledgeable in reading elevations and wall sections.

LEARNING PRACTICE (cont'd):

7. When you are satisfied that you have identified correctly all of the structural components on the elevations and wall section, report to your instructor for evaluation.
8. You will be asked to identify orally, from a house plan, structural components on elevations and a typical wall section. When you have responded in a satisfactory manner you will be directed to the next unit.
9. Happiness is a well done task package.

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: CARPENTRY
COURSE: CARPENTRY

C-VII

UNIT PACKET VIII: FOOTINGS AND FOUNDATIONS FOR A HOUSE

PREREQUISITES: UNIT I, TASK PACKAGES 1, 4, 11, and 13

RATIONALE:

A carpenter must be able to use a builder's level or transit with precision if he is to establish foundation layouts, grades, and other layout jobs accurately. In order to learn how to use the transit or builder's level requires practice in the actual use of these instruments. Through the use of the transit the carpenter is able to set up batter boards which serve as an aid to him in laying out the house. The overall size of the house is plotted by applying strings to the [illegible] on the batter boards, thereby, plotting the overall width and length of the house. In his work the carpenter must also know the various types of foundations supports used in constructing a house. As a student in carpentry then you, too, must become familiar with the use of the transit or builder's level, the installation of batter boards, and become aware of the various types of foundation supports. Continue, by reading the [illegible] for the unit and the Specific Objectives for each task package within the unit. Proceed, then, by reading the [illegible], which outlines what you are to do and how to proceed in getting the job done.

OBJECTIVES:

GENERAL:

Upon completion of this unit you will be able to lay out a foundation for a house and know types of foundation supports.

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Set up a transit to level corners so that the four corners of a house are at the same elevation and spaced according to specifications provided by your instructor. Accuracy will be judged by the instructor to a tolerance limit of ± 0.05 feet or ± 1/32 inch, depending upon the type of rod used for all corners.
2. Set up batter boards to lay out a house, maintaining the following:
   a. Building lines are of the correct length (± 1/32").
   b. Building lines are correctly located (± 1/32").
   c. Corners are square (± 0° one minute).
   d. Building lines are level; that is, the batter boards are of the same elevation (± 0.05').

   Your performance will be evaluated in accordance with the instructor's checklist.
3. Describe on a written test supplied by the instructor where, when, and how each of the following four types of foundation

OBJECTIVE (cont'd):

supports is used in constructing a house:

a. 8" brick foundation wall.

b. 8" brick and block foundation wall.

c. solid concrete foundation wall.

d. pillar foundation.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on Footings Foundations For A House is made up of three task packages which should be completed in numerical order. You will note that the only prerequisites necessary, prior to beginning work are found in Unit 1. As you work on each task package in this unit, you will view a sound-slide package, perform readings, answer questions, and complete other activities as directed.

The titles of the packages within this unit are:

TASK PACKAGE 1: TRANSIT

TASK PACKAGE 2: BATTER BOARDS

TASK PACKAGE 3: TYPES OF FOUNDATION SUPPORTS

If after reading the unit package thus far, you feel that you can pass a comprehensive test covering the information contained in this unit you should report to the instructor for the examination. If you do not, [illegible], feel ready to be examined, at this time, you should commence work on the task packages as indicated.

C-VII-1

UNIT VII: FOOTINGS AND FOUNDATIONS FOR A HOUSE

TASK PACKAGE 1: TRANSIT

PREREQUISITES: UNIT I; TASK PACKAGES 1, 4, 11 and 15

RATIONALE:

Don't give in to any transitory daydreams here, but get familiar with the use of the transit. This transit has nothing to do with a carrying company, but this task package will carry you to useful knowledge on how to obtain accurate layouts with a transit.

A carpenter must be able to use a builder's level or transit level with precision if he is to establish foundation layouts, grades, and other layout jobs accurately. The skill in using a builder's level or transit to obtain accurate layouts is developed only by actual practice in using these instruments to establish layouts. In this task package you will gain experience in using the transit to level corners of a house so that they are at the same elevation and properly spaced. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to set up a transit to level corners so that the four corners of a house are at the same elevation and spaced according to specifications provided by your instructor. Accuracy will be judged by the instructor to a tolerance limit of ± 0.05 feet or 1/32 inch depending upon type of rod used for all corners.

LEARNING ACTIVITY:

1. View sound-slide package C-VII-1 as the outstanding feature today.
2. Read Modern Carpentry, pages 43-51, on Leveling Instruments.
3. Read and study the ~~sheets~~ attached to this task package concerning the Level, the Level-Transit, Care and Handling, Sighting and Focusing the Telescope, and How to Set Up Your Instrument for Use. (This material is particularly helpful since it relates directly to the instrument you will be using).
4. This completes the Learning Activity; begin now on the Learning Practice.

STAKING PRACTICE (cont'd):

Tools and Equipment

1. Level-Transit
2. Tripod
3. 12 pc. 2" x 4" approximately 2' long
4. Hatchet
5. Hammer
6. Folding wood rule

1. Report to your instructor and discuss leveling instruments; their care, installation, and use.
2. You will be issued the tools and equipment above; go now to the spot designated by your instructor and set up the tripod as covered in Modern Carpentry, pages 45 - 46, and on the attached sheet entitled How to Set Up Your Instrument for Use. Note - handle the transit with care; it is a precision instrument and if dropped can be seriously damaged.
3. Place the transit on the tripod and fasten securely in place. (See the attached sheet How to Set Up Your Instrument for Use.)
4. Level the transit according to the procedure covered in the reference in 3 above.
5. Cut the ends of all twelve 2" x 4" stakes to a point using the hatchet.
6. At the place designated by your instructor (probably the highest elevated point on the site you are using), drive into the ground

LEARNING PRACTICE (cont'd):

three 2" x 4" stakes approximately 2 1/2' apart. They should form an angle of approximately 90°. (Similar to those shown installed in the slide-sound package C-VII-1 and also looking somewhat like those in figure 6-3, page 88, in Modern Carpentry).

7. Form another corner of approximately 90° with the 2 x 4's 28' away at designated location.
8. Form a rectangular layout (28' x 44') similar to figure 6-3, page 88, in Modern Carpentry. Use three of the remaining stakes at one corner and three at the other. Your layout will look like figure 1 in this task package.
9. Have a fellow student hold a folding wood rule 10 inches from the ground and against the corner post of the first 3 stakes (see figure 1).
10. Sight a level line with the transit to this rule, noting and recording the measurement. Mark that point on the corner post and also mark a point at the end of the rule 10" off the ground.
11. Have your helper hold the rule against each stake in succession, and you sight a level line with the transit, having your helper line the rule up to the exact dimension as before. Have him mark this dimension on each post and also place a mark

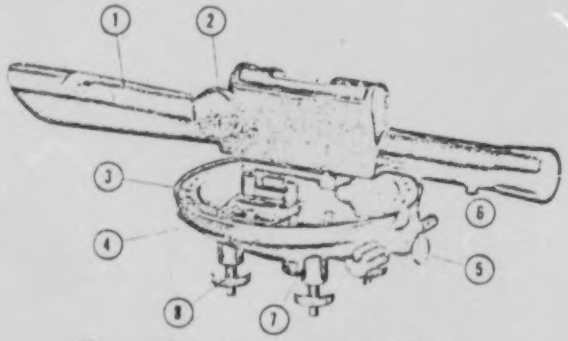
LEARNING PRACTICE (cont'd):

on the post at the end of the rule each time.

12. When you have completed this exercise you will have sighted a level line to all 12 stakes and made two marks on each stake. All the upper marks on the stakes form a level plane as well as do all the lower marks.
13. When you are satisfied you have completed the job satisfactorily, let your instructor check your work.
14. If you have performed the exercise in an acceptable manner you will be directed to the next task package.
15. Be sure to save this layout of the stakes as you will be using it in the next task package.
16. You did a good job and that's on the level!

Meridian

8090 LEVEL



General Description of 8090 Level

The 10½ inch long telescope with a built-in sun shade furnishes a sharp magnifying power of 18 times, and has an objective lens (1) of $^{15}/_{16}$ inch diameter. To focus on an object, turn the focusing knobs (2) in the proper direction, with either your right or left hand. No separate focusing of the cross-hairs is necessary, since they are in a fixed focus. The $1\frac{7}{8}$ inch long telescope vial is protected by a strong die cast casing.

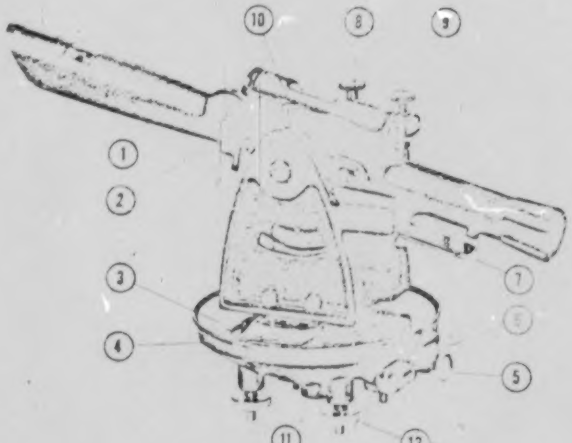
The fully enclosed, adjustable horizontal circle (3) is divided in degrees and numbered every 10 degrees in quadrants, from 0 degrees to 90 degrees. Various angles can be measured with the aid of the index vernier (4). Approximate horizontal settings are held firmly in place by means of a clamp screw (5). Fine horizontal settings can be made with the tangent screw (6).

The instrument is mounted on the tripod head by a center screw and cup in the tripod head assembly (not shown) which screws onto the protective die cast base assembly (7). At the lower end of the tripod's center screw, a hole is provided for the cord of the plumb bob, which is used to center the level transit on a desired point.

Four leveling screws (8) level the instrument. When removing the instrument from the tripod, first loosen the four leveling screws before unscrewing the center screw.

Meridian

8080 LEVEL-TRANSIT



General Description of 8080 Level-Transit

Construction features of the 8080 level-transit are identical to those of the 8090 Level with the exception of its tilting telescope construction. Refer to general description of 8090 for reference to items (1) through (6).

The locking lever (7) is in a closed position when the instrument is to be used as a level, or in open position when used for plumbing or measuring vertical angles. The vertical clamp screw (8) secures the telescope on the approximate angle. Fine vertical settings can be made with the tangent screw (9). The vertical arc is divided in degrees and numbered every 10 degrees up to 45 degrees, for both upward or downward angles, and has an adjustable self indexing pointer (10).

Tripod center screw and cap assembly screws into threaded base (11). Four leveling screws (12) level the instrument

HOW TO SET UP YOUR INSTRUMENT FOR USE

1. It is important that the tripod is set up firmly. Make sure that the tripod points are well into the ground. On a paved surface, be sure the points hold securely. Check the tripod legs and see that they are fastened securely to the tripod head. The legs should have about a 3½ foot spread, positioned so that the top of the tripod head appears to be level.

2. Carefully place the instrument on the tripod and fasten securely. With instruments 8080 and 8090, the leveling screws must be turned up far enough into the head so that the center screw can be tightened firmly to the instrument. The leveling screws are backed out to firmly hold the instrument to the tripod. With instruments with a screw type base such as the 8114 and 8300, the base is screwed firmly onto the tripod.

3. If it is necessary to move the instrument over a direct point, this must be done before final leveling.

4. Leveling is the most important operation in preparing to use the instrument. No reading taken, nor operation performed with the instrument, can be accurate or dependable unless the instrument is level throughout the complete operation. When using transit instruments be sure that the telescope is locked securely into the level position.

Line up the telescope so that it is directly over one pair of opposite leveling screws. Bring the bubble to the center of the vial by means of the leveling screws over which the telescope was set.

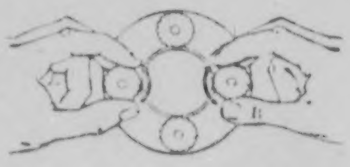
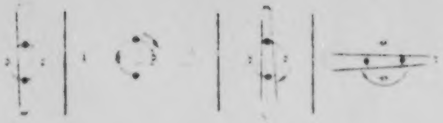
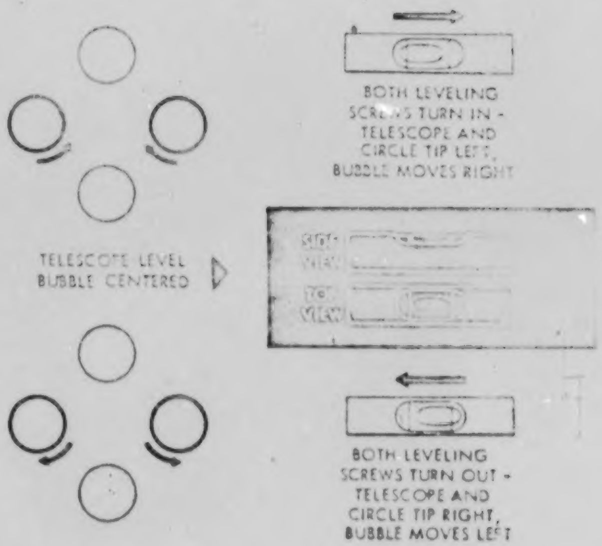


Figure 2 – Adjusting the Leveling Screws



Grasp these 2 leveling screws with the thumb and forefinger of each hand, and turn both screws at the same time by moving the two thumbs toward each other or away from each other as shown on (figure 2). When the bubble is centered, rotate the telescope 90° to be over the second pair of leveling screws, and repeat the leveling operation as was done to the first pair. You will note that moving the thumbs toward each other moves the bubble in the vial to the right, and moving the thumbs away from each other, move the bubble toward the left (figure 3). When the leveling is completed, it should be possible to turn the telescope in a complete circle without any change in the position of the bubble. Never force or tighten the leveling screws too tight, as this may injure the instrument.

Figure 3 – Moving Telescope Bubble with the Leveling Screws


BOTH LEVELING SCREWS TURN IN - TELESCOPE AND CIRCLE TIP LEFT, BUBBLE MOVES RIGHT
TELESCOPE LEVEL BUBBLE CENTERED
SIDE VIEW
TOP VIEW
BOTH LEVELING SCREWS TURN OUT - TELESCOPE AND CIRCLE TIP RIGHT, BUBBLE MOVES LEFT

CARE AND HANDLING

When instrument is not being used, keep it in its carrying case. Tighten all four leveling screws after screwing instrument to case base . . . tighten clamp screws . . . disengage lock levers on level transits.

Handle the instrument by its base after removing it from its case and while attaching it to the tripod. Prevent falls — a fall will certainly cause damage. Never use force on any parts of the instrument. All moving parts should turn freely and easily.

Keep the instrument clean and free from dust and dirt. Clean the objective and eyepiece lenses by brushing with a soft brush or lens tissue. Rubbing with cloth may cause scratches. Do not remove objective lens.

Internal cleaning, oiling, checking or adjustments of the telescope tube, instrument centers or spindle must be conducted under controlled conditions and should not be undertaken in the field. Leave this work to your repair station. It is recommended that all precision instruments have periodic inspection and service by a qualified instrument repair station or the manufacturer once or twice a year depending upon use.

SIGHTING AND FOCUSING THE TELESCOPE

Be sure clamp screws are loosened to permit free telescope movement. Aim the telescope at object and sight first along the top of telescope tube. Then look through telescope and adjust focus. (On Universal models, crosshairs are also brought into focus by turning eyepiece.)

When crosshairs are positioned on or near target, tighten clamp screw and make final adjustments with the tangent screw to bring the crosshair *exactly* on point.

When sighting through the telescope, keep both eyes open. You will find that this eliminates squinting, will not tire the eyes and gives the best view through the telescope.

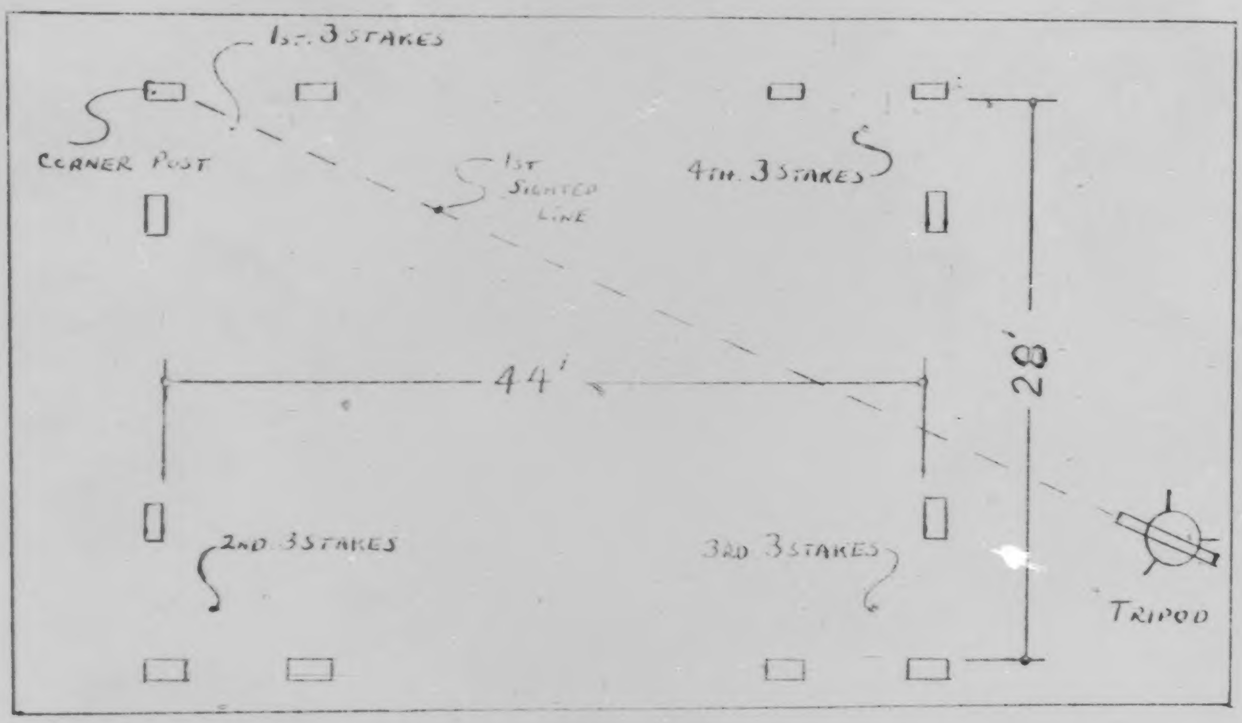


Figure 1

UNIT VII: FOOTINGS AND FOUNDATIONS FOR A HOUSE

TASK PACKAGE 2: BATTER BOARDS

PREREQUISITES: UNIT I, TASK PACKAGES 1,4,5, and 15; UNIT VII, TASK PACKAGE 1

RATIONALE:

Batter board up! You may hit a graceful home run with a bat, but you make a beautiful house layout with the help of a batter board. So batter board up - and let's not strike out on this task package.

In addition to being able to use a transit (or level) to obtain points located in the same plane and marked on the stakes (see task package 1 of this unit), the carpenter must also be able to finish construction of the batter boards as an aid to him in laying out the house. On the cross member (ledger) of the batter boards the carpenter strings his building lines, making the size of the house the correct length and width and the corners square. In this task package you will gain experience in the construction of the batter boards and in stringing building lines for a rectangular house. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice, referring back to the Objective as often as necessary.

OBJECTIVE:

Upon completion of this task package you will be able to set up batter boards to lay out a house maintaining the following:

a. the building lines are of the correct length (±1/32").

b. the building lines are correctly located (±1/32").

c. the corners are square (±0° one minute).

d. the building lines are level; that is, the batter boards are of the same elevation (±0.05').

Your performance will be evaluated in accordance with the the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-VII-2 and tell your friends about it.
2. Read Modern Carpentry, pages 87-89, down to Excavation.
3. Discuss with another student the procedure for setting up batter boards.
4. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Eight pieces of stock for batter board cross members
2. Level
3. 100 foot layout tape
4. Framing square
5. Combination square
6. Folding wood rule
7. Hammer and nails
8. Cross cut saw
9. Twine or cord

1. Discuss with your instructor the setting up of batter boards and stringing building lines.
2. Take all of the tools and equipment to the site layout you completed in task package 1 of this unit.
3. As you recall, you had driven four sets of stakes into the ground, with each set having three stakes each. You had also placed two marks on each stake (one mark located with the aid of the transit and the other marked on the stake using the end of the folding wood rule as an aid in locating it).
4. Square a line around each stake at the level of the bottom line.
5. Using your eight pieces of stock, separately nail them to the upright stakes (see 3 above) so that the top edges of the boards (ledgers) are exactly even with the bottom line on the stakes. This arrangement will appear similar to the batter boards in figure 6-4, page 88, in Modern Carpentry.
6. Now install the twine on the ledger strips by making a saw kerf on the back side of each strip (see figure 6-5, page 88, in Modern

LEARNING PRACTICE (cont'd):

Carpentry). Make the saw cuts on the ledger strips so that they are 24' apart on the short side of the rectangle and 40' apart on the long side.

7. Tie knots on the end of the twine and install in the saw kerf so that a rectangle is produced that is 24' x 40'. (See figure 6-5 and figure 6-6 in Modern Carpentry.)
8. Check across the diagonals of the rectangle (from corner to corner of the twine) to determine whether or not the distances are equal.
9. If the diagonals are not equal, shift the lines by making new saw kerfs in the ledgers and insert the twine in the new cuts until the diagonals are equal.
10. After the lines are correctly located - that is, they produce a true rectangle 24' x 40' - cut away the saw kerfs that are not in use. This is done by taking a knife or saw and cutting a large "V" in the kerf so that the twine will no longer catch in the kerf. This practice prevents the wrong slots from being used.
11. After you are satisfied that this exercise has been completed correctly, let your instructor check your work.
12. When it is determined that your work has been completed in a satisfactory manner, you will be directed to the next task package.
13. Did you hear about the student that thought batter boards were something a baseball player uses? Certainly that's not you.

C-VII-3

UNIT VII: FOOTINGS AND FOUNDATIONS FOR A HOUSE

TASK PACKAGE 3: TYPES OF FOUNDATION SUPPORTS

PREREQUISITES: UNIT VII, TASK PACKAGES 1 AND 2

RATIONALE:

Foundations are always important. You, yourself, should get a good foundation in your studies. Foundations of every type concern us every day, and here's your chance to learn about house foundations.

The wise man knows that a house that is built directly upon the sand will soon fall; whereas, those houses built upon a solid foundation may withstand great forces from man and the weather and still remain solid. The good carpenter knows the various types of foundation supports used in constructing a house and to be knowledgeable you should become familar with them too. In this task package you will learn about four types of foundation supports and will be able to describe when, where, and how each of these supports is used in house construction. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

C-VII-3

OBJECTIVE:

Upon completion of this task package you will be able to describe in writing where, when, and how each of the following four types of foundation supports is used in constructing a house:

a. the 8" brick foundation wall.

b. the 8" brick and block foundation wall.

c. the solid concrete foundation wall.

d. the pillar foundation.

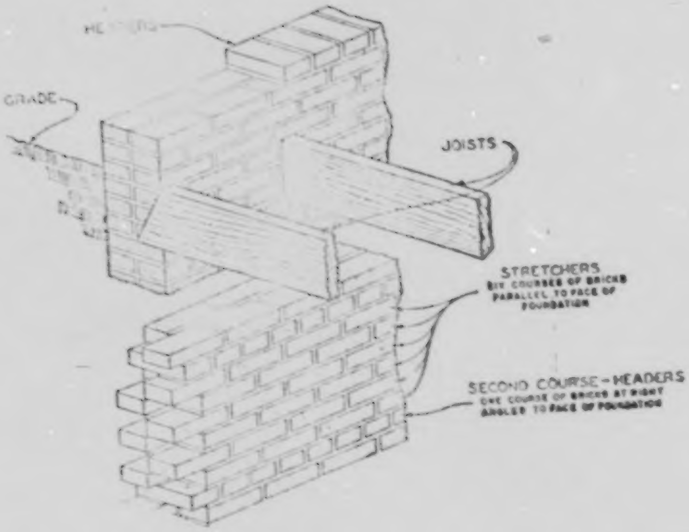
Your performance will be evaluated in accordance with the instructor's checklist.

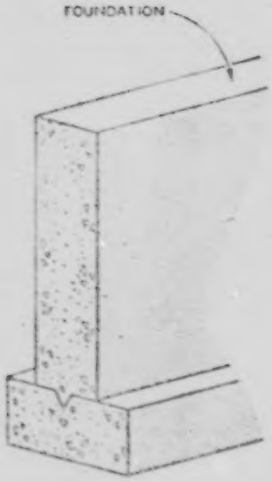
LEARNING ACTIVITY:

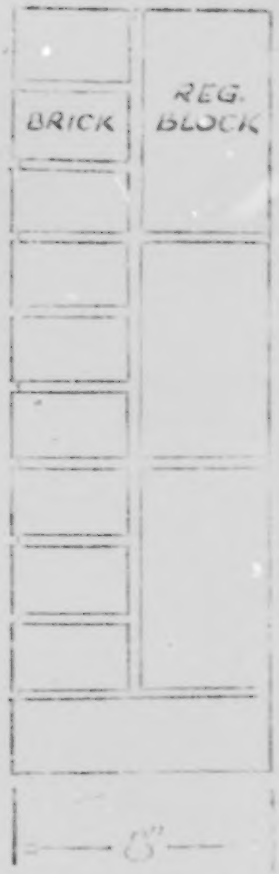
1. View sound-slide package C-VII-3 for today's feature.
2. Read Modern Carpentry, pages 89-95 to the section entitled Form Ties.
3. Study drawings attached to this task package which illustrate four types of foundation supports.
4. If possible visit a construction site to observe the types of foundation supports in use.
5. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

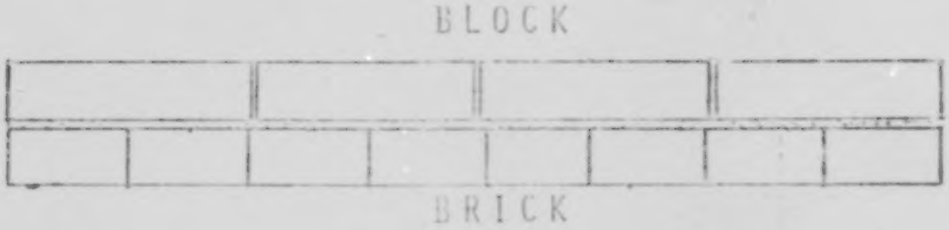
1. Report to your instructor and discuss the advantages and disadvantages of the 8" brick foundation wall, the 8" brick and block foundation wall, the solid concrete foundation wall, and the pillar foundation.
2. Refer to the illustrations attached to the end of this task package, noting particularly:
    a. the 8" brick foundation wall is two courses of brick thick and will rest on a concrete footing.
    b. the 8" brick and block foundation wall is composed of one course of 4" brick and one course of 4" block, both resting on a concrete footing. (Note - a 12" brick and block wall is possible with 4" brick and 8" block.)
    c. the solid concrete wall resting on a concrete footing.
3. For an illustration of the pillar construction refer to the pillars on the site just outside the carpentry laboratory.
4. Discuss with your classmates where, when, and how each of the foundation supports is used to the best advantage.
5. When you feel you understand the four types of foundation supports, report to your instructor for his evaluation.
6. Upon satisfactory completion of his evaluation procedure, you will be directed to the next unit.
7. This task package was meant to give you a good foundation support for what is to come later. Are you ready?


HEADERS
GRADE
JOISTS
STRETCHERS
SIX COURSES OF BRICKS PARALLEL TO FACE OF FOUNDATION
SECOND COURSE-HEADERS
ONE COURSE OF BRICKS AT RIGHT ANGLES TO FACE OF FOUNDATION


FOUNDATION


BRICK
REG. BLOCK
8"

ELEVATION VIEW


BLOCK
BRICK

1ST COURSE PLAN

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: CARPENTRY
COURSE: CARPENTRY

CE0039~~30~~ 29 (4)

UNIT PACKAGE VIII: HOUSEHOLD CABINETS

PREREQUISITES: UNIT I, TASK PACKAGES 1-3, 5-10, 12-15; UNITS II-IV;
UNIT V, TASK PACKAGES 1 and 3; UNIT VI, TASK PACKAGE I

RATIONALE:

In his work the carpenter should understand the construction of bathroom and kitchen cabinets. He may have to only install custom-built units or may be required to build the cabinets on-the-job. As a part of his job the carpenter may also install mass produced units purchased from some large manufacturer. In order to determine the size, shape, and kind of cabinet required for the job, the carpenter must be able to read and interpret architectural plans. All of the afore mentioned activities require skill and attention to details. As a carpentry student you should learn to identify parts of cabinets and know their relationship to other parts. Continue, by reading the General Objective for the unit and the Specific Objectives for each task package within the unit. Proceed, by reading the Learning Activity, which explains what you are to do in this unit and how you are to go about performing the tasks.

OBJECTIVES:

General:

Upon completion of this unit you will be able to identify and understand the function and relationship of component parts of household cabinets.

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Orally identify the component parts of the bathroom cabinet and give the function of each part and its relationship to other cabinet parts as set forth in Unit 18 of *Modern Carpentry*. Variations in construction used locally will be explained by your instructor. Your performance will be evaluated in accordance with the instructor's checklist.
2. Understand the construction of the kitchen overhead cabinets as presented in Unit 18 of *Modern Carpentry*; any variations in local construction practices will be explained by your instructor. You will be required to identify the component parts of the overhead kitchen cabinets and give the function of each part and its relationship to other parts of the cabinet. You will be evaluated by the instructor's checklist.
3. Orally identify the component parts of the base kitchen cabinets and give the function of each part and its relationship to other parts of the cabinet as detailed in Unit 18, *Modern Carpentry*. Any differences in local construction practice will be explained by your instructor. Your performance will be evaluated by the instructor's checklist.

OBJECTIVES (cont'd):

4. Install the laminated plastic top with a permanent bond upon a kitchen base cabinet following the procedure and criteria as outlined in Unit 18 of Modern Carpentry. Successful completion will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on Household cabinets consists of four task packages which maybe completed in random order provided all prerequisites are satisfied. As you perform the required work on each task package you will view a sound-slide package, perform readings, answer questions, and complete other activites as directed.

The titles of the packages within this unit are:

Task Package 1: BATHROOM CABINETS
TASK PACKAGE 2: KITCHEN OVERHEAD CABINETS
TASK PACKAGE 3: KITCHEN BASE CABINETS
TASK PACKAGE 4: LAMINATED KITCHEN CABINET TOPS

If after reading the unit package thus far, you feel that you can pass a comprehensive test covering the information contained in this unit you should report to the instructor for the examination. If, however, you feel you are not ready to be examined, begin work on the task packages as indicated.

UNIT VIII: HOUSEHOLD CABINETS

TASK PACKAGE 1: BATHROOM CABINETS

PREREQUISITES: UNIT I, TASK PACKAGES 1-3, 5-10, 12-15; UNITS II-IV; UNIT V, TASK PACKAGES 1 AND 3; UNIT VI, TASK PACKAGE 1

RATIONALE:

Remember Old Mother Hubbard? She had a cupboard, but the nursery rhyme didn't say whether she had a bathroom cabinet or not. She probably would have appreciated one, but you weren't around at the time to build it for her.

The carpenter needs to understand the construction of bathroom and kitchen cabinets. In his work he may have to build on-the-job cabinets or install custom-built units constructed in local cabinet shops or mill work plants. He may also have to install mass produced cabinets available from factories that specialize in this area of manufacturing. Whether the carpenter is building cabinets himself or installing pre-built cabinets, he is performing a task that requires skill and careful attention to detail. The carpenter also needs to be able to read architectural plans indicating the sizes and locations of the bathroom and kitchen cabinets. In this task package you will be required to become familiar with bathroom cabinet construction and how component parts relate to the entire cabinet. Continue by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

> Upon completion of this task package you will be able to orally identify the component parts of the bathroom cabinet and give the function of each part and its relationship to other cabinet parts as set forth in Unit 18 of Modern Carpentry. Variations in construction used locally will be explained by your instructor. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-VIII-1. This package will be applicable to all task packages in Unit VIII and will be given for all packages. You may view it as often as you feel necessary. You like instant replays, don't you?
2. Read and study Unit 18, Cabinet Making, pages 383-406 in Modern Carpentry. Note particularly any parts that apply to the bathroom or variety cabinets.
3. If time permits, visit a local cabinet shop to observe bathroom and other cabinets being constructed.
4. Observe the advanced class when they construct household cabinets.
5. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

1. From the illustrations and discussion in Unit 18 of Modern Carpentry and a review of sound-slide package C-VIII-1, prepare a list in writing of the component (individual) parts of the bathroom cabinet.
2. Opposite the name of each part, write the part's function and its relationship to other cabinet parts.
3. If you encountered difficulty with 1 or 2 above, seek assistance from individuals familiar with bathroom cabinet construction.
4. Now, complete your listing of the parts, their function, and their relationship to other parts.
5. When you feel that you have completed the requirements of this task package, report to your instructor.
6. When your instructor has determined you have demonstrated satisfactory knowledge regarding bathroom cabinets, you will be directed to the next task package.
7. The next task package will be found in Old Mother Hubbard's cupboard. You didn't know that you could do it, did you?

UNIT VIII: HOUSEHOLD CABINETS

TASK PACKAGE 2: KITCHEN OVERHEAD CABINETS

PREREQUISITES: UNIT I, TASK PACKAGES 1-3, 5-10, 12-15; UNITS II-IV; UNIT V, TASK PACKAGES 1 AND 3; UNIT VI, TASK PACKAGE 1; UNIT VIII, TASK PACKAGE 1

RATIONALE:

Old Mother Hubbard would undoubtedly have traded her cupboard for a series of nice kitchen overhead cabinets. She would have had better storage for all her cups there - and then her cupboard really would have been bare.

In his work the carpenter finds it necessary to understand the construction of household cabinets. He may be required to build the cabinets on the job or certainly install custom-built units or mass-produced cabinets. In any instance the carpenter needs to be skilled in his performance and give careful attention to details which this work requires. He also needs experience in reading architectural drawings because sizes and placement of cabinets are shown. In this task package, you will be given the opportunity to learn about kitchen overhead cabinets and how the various component parts relate to the entire cabinet. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to understand the construction of the kitchen overhead cabinets as presented in Unit 18 of Modern Carpentry; any variation in local construction practices will be explained by your instructor. You will be required to orally identify the component parts of the overhead kitchen cabinets and give the function of each part of its relationship to other parts of the cabinet. You will be evaluated by the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-VIII-1. This package covers material that applies to all the task packages in this unit and may be reviewed as often as necessary. Like those summer re-runs on TV?
2. Read and study Unit 18, Cabinetmaking, pages 383-406 in Modern Carpentry. Note those parts that deal specifically with the kitchen overhead cabinets.
3. If time permits visit a local cabinet shop to observe kitchen overhead cabinets and other cabinets being constructed.
4. Make observations of the advanced class as they construct household cabinets.

LEARNING ACTIVITY (cont'd):

5. This finishes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

1. From the pictures and the discussion in Unit 18 of Modern Carpentry and a review of sound-slide package C-VIII-1, prepare in writing a list of the component parts of the kitchen overhead cabinet.
2. Opposite the name of each part, write the part's function and its relationship to the other cabinet parts.
3. If difficulty was experienced in listing the parts or their function, contact individuals having knowledge of kitchen overhead cabinets.
4. Complete your listing of the parts of the overhead kitchen cabinet and each part's function.
5. If you feel you have completed the list satisfactorily and understand the parts and their functions, report to your instructor.
6. When your instructor has evaluated your work, he will direct you to the next task package.
7. Let's get down to the floor level with the next task package, which is on the kitchen base cabinets.
8. Old Mother Hubbard keeps popping up in all these cabinet packages. She's still trying to find her poor dog a bone.

UNIT VIII: HOUSEHOLD CABINETS

TASK PACKAGE 3: KITCHEN BASE CABINETS

PREREQUISITES: UNIT I, TASK PACKAGES 1-3, 5-10, 12-15; UNITS II-IV;
UNIT V, TASK PACKAGES 1 and 3; UNIT VI, TASK PACKAGE 1;
UNIT VIII, TASK PACKAGES 1 and 2

RATIONALE:

Old Mother Hubbard couldn't get to first base with her dog because she couldn't find him a bone. The truth is she didn't have any base kitchen cabinets to store the bones in. She couldn't even put her Ajax or Lux Liquid out of sight.

As has previously been stated in task packages 1 and 2 in this unit, the carpenter needs to understand the construction of the bathroom and kitchen overhead cabinets. Of equal importance, he must also have a thorough working knowledge of the kitchen base cabinets. He may be responsible for building the cabinets or installing pre-built cabinets. In addition, he must be able to read and understand architectural plans which show the location and size of the base cabinets in the kitchen. In this task package you will be given the opportunity to become familiar with the construction of the kitchen base cabinets and how component parts relate to the entire cabinet. Continue by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to orally identify the component parts of the base kitchen cabinets and give the function of each part and its relationship to other parts of the cabinet as detailed in Unit 18, Modern Carpentry. Any differences in local construction practice will be explained by your instructor. Your performance will be evaluated by the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-VIII-1. This package contains material that applies to packages 1-4 in this unit and may be viewed as often as necessary. Admission is always free.
2. Read and study Unit 18, Cabinetmaking, pages 383-406 in Modern Carpentry. Note particularly any part that applies specifically to the kitchen base cabinets.
3. If time permits visit a local cabinet shop to observe kitchen base cabinets and other cabinets being constructed.
4. Observe the advance class as they construct household cabinets.
5. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

1. From the illustrations and discussions in Unit 18 of Modern Carpentry and a review of sound-slide package C-VIII-1, prepare in writing a listing of the component parts of the kitchen base cabinet.

LEARNING PRACTICE (cont'd):

2. Opposite the name of each part, write the part's function and its relationship to other cabinet parts.
3. If difficulty was encountered in listing the name of the part or its function, seek assistance from an individual familiar with the construction of the kitchen base cabinet.
4. Complete your listing of the kitchen base cabinet parts and their functions.
5. If you feel you understand the material in this package, report to your instructor for his evaluation.
6. Upon satisfactory demonstration of your knowledge of the kitchen base cabinets, you will be directed to the next task package.
7. Ready to put a top on this cabinet? The next task package is for you!

Do your work with care. Old Mother Hubbard needs a modern kitchen.

UNIT VIII: HOUSEHOLD CABINETS

TASK PACKAGE 4: LAMINATED KITCHEN CABINET TOPS

PREREQUISITES: UNIT I, TASK PACKAGES 1 and 10, UNIT II, TASK PACKAGE 6; UNIT V, TASK PACKAGES 1 and 3; UNIT VIII, TASK PACKAGES 1-3

RATIONALE:

Lamination for Old Mother Hubbard? Thunderation and tarnation! This new-fangled technique will bring a sparkle to her eye and make her poor dog forget his bone.

After the construction and/or installation of the kitchen base cabinet, the carpenter must be able to install the laminated cabinet top. He must know the procedure for applying the adhesive and for attaching the plastic lamination. In accomplishing this job the carpenter must demonstrate considerable skill since an improperly installed top will affect the entire appearance of the kitchen. Therefore, proper installation of the laminated top becomes as important as the construction of the cabinets themselves. In this task package you will learn how to install the laminated plastic top onto the kitchen base cabinet. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to install the laminated plastic top with a permanent bond upon a kitchen base cabinet following the procedure and criteria as outlined in Unit 18 of Modern Carpentry. Successful completion will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide packages C-VIII-1. This package contains material applicable to task packages 1-4 in this unit and may be viewed as often as necessary. Have you got it memorized yet?
2. Read and study Unit 18, Cabinetmaking, pages 383-406, in Modern Carpentry. Note particularly those sections dealing with the lamination of kitchen cabinet tops.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Small piece of wooden stock
2. Small piece of plastic laminating stock
3. Adhesive
4. Block plane
5. Belt sander

LEARNING PRACTICE (cont'd):

1. On the face, one edge, and one end of a piece of stock apply the adhesive for bonding the laminated plastic to the wood. (See pages 396-399 in Modern Carpentry for the procedure for applying the adhesive. Also refer to Task Package 3, Unit V).
2. Attach the lamination to the face, one edge, and one end of the stock.
3. When the lamination is dry, bevel the edges between the top and edge and between the top and the end, using the block plane. (See Task Package 6, Unit II).
4. Sand these bevel edges smooth with the belt sander. (See Task Package 10, Unit I).
5. When you are satisfied that you have properly attached the lamination and beveled its edges, turn in your finished work to your instructor.
6. Upon your satisfactory completion of the Learning Practice, your instructor will direct you to the next unit.
7. You're really sticking in there, neighbor.
   Old Mother Hubbard has gone mad now!

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
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CLUSTER: CARPENTRY
COURSE: CARPENTRY

CE003929(1)

UNIT PACKAGE IX: FLOOR FRAMING FOR A HOUSE

PREREQUISITES: UNITS I-VII

RATIONALE:

In house construction the carpenter must know how to construct a floor beam or girder with ledger strips. He must also know how to attach the floor joists to the beam and to cross members called headers. After the floor joists have been assembled in place the carpenter must install solid or cross bridging to assure that the joists remain stationary and with a uniform space between them. On top of the floor joists is placed the subflooring which provides the base for further construction. At this stage, the carpenter now cuts, marks, and installs the bottom plate (shoe) directly upon the subfloor. As a carpentry student you must also learn how to do the above operation. Continue, now, by reading the General Objective for the unit and the Specific Objectives for each task package within the unit. Proceed, by reading the Learning Activity, which explains what you are to do in this unit and how you are to proceed in performing the tasks.

OBJECTIVES:

General:

Upon completion of this unit you will be able to cut and install the floor framing and the bottom plate (shoe) in a residential structure.

OBJECTIVES (cont'd):

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Construct a floor beam or girder with ledger strips from a drawing provided by your instructor, maintaining the following:
    a. joints of the laminated beam are staggered and are properly positioned over posts or piers.
    b. beam is nailed with 16d nails that are staggered and not over 16 inches apart.
    c. bottom of the beam is level with bottom of the floor joists and headers and with the tops of the piers (± 1/16").
    d. size, spacing, and free span of beam comply with plans and specifications (± 1/8").
    e. crown of the beam between piers is in the up position.
    f. 2" x 2" ledger strips are attached flush to the bottom of the beam with 16d nails that are staggered and not over 12 inches apart.

    Your performance will be evaluated in accordance with the instructor's checklist.

2. Cut and install floor joists in accordance with plans provided by your instructor to the following standards:
    a. joists are cut to the correct length (± 1/16").

OBJECTIVES (cont'd):

b. joists are positioned on 16" centers (± 1/16").

c. joists' crowns are installed in the up position.

d. floor joists are nailed properly.

e. double joists are positioned under load bearing partitions.

Your performance will be evaluated in accordance with the instructor's checklist.

3. Cut and install solid and cross bridging between joists on a residential floor from drawings provided by your instructor to the following standards:

a. bridging has been properly cut with respect to length and angle of cut (± 1/16").

b. bridging has been properly nailed to the joists.

c. floor joists are straight and plumb after bridging has been installed (± 1/16").

d. bridging has been properly placed in accordance with plans and specifications.

Your performance will be evaluated in accordance with the instructor's checklist.

4. Cut and install the subfloor in a residential structure from specifications provided by your instructor to the following standards:

a. joints of subfloor material are aligned with centers of floor joists (± 1/16").

OBJECTIVES (cont'd):

b. joints of subfloor materials are properly staggered.

c. subfloor material is properly nailed to joists.

d. subfloor joints are tight (space in joints does not exceed 1/8" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

5. Cut, mark, and install shoe(sole plate) in a residential structure from a drawing provided by your instructor to the following standards:

a. shoe of the correct length (± 1/32").

b. openings are properly laid out (± 1/16").

c. partitions are properly laid out (± 1/16").

d. shoes are straight and are correctly nailed.

e. trimmer and cripple studs are properly marked.

f. studs are laid out 16" centers (± 1/16").

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on Floor Framing For A House consists of five task packages which should be completed in numerical order. Note that units I-VII should be completed prior to beginning this unit. As you do the required work on each task package you will view a

LEARNING ACTIVITIES (cont)

sound-slide package, perform laboratory, answer questions, and complete other activities as directed. The titles of the packages contained in the unit are:

TASK PACKAGE 1: [illegible] WITH LEDGER STRIPS

TASK PACKAGE 2: [illegible] JOISTS

TASK PACKAGE 3: BRIDGING

TASK PACKAGE 4: SUBFLOOR

TASK PACKAGE 5: SHOE (SOLE PLATE)

If after reading the unit package, you determine that you can pass a comprehensive test over the information covered in this unit, you should secure the examination from the instructor. If you feel that you are not ready to be examined, begin work on the task packages as outlined above.

UNIT IX: FLOOR FRAMING FOR A HOUSE

TASK PACKAGE 1: FLOOR BEAM WITH LEDGER STRIPS

PREREQUISITES: UNITS I-VII

RATIONALE:

Are you still on the beam? You haven't been floored yet, have you? Good! Then let's get on the floor beam.

In house construction the carpenter needs to know how to construct a floor beam or girder with ledger strips. The number of floor beams used depends upon the size of the house. The beam is a central support which carries the floor joists when they are suspended over a large area. The house that you will help build will have a floor beam with ledger strips. Therefore, you will need to learn how this structural member is constructed and where and how it is to be used. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice, referring back to the Objective as often as you feel necessary.

OBJECTIVE:

Upon completion of this task package you will be able to construct a floor beam or girder with ledger strips from a drawing provided by your instructor maintaining the following:

a. the joints of the laminated beam are staggered and are properly positioned over posts or piers.

b. the beam is nailed with 16d nails that are staggered and not over 16 inches apart.

c. the bottom of the beam is level with the bottom of the floor joists and headers and with the top of the piers (± 1/16").

d. the size, spacing, and free span of the beam complies with plans and specifications (± 1/8").

e. the crown of the beam between piers is in the up position.

f. the 2" x 2" ledger strips are attached flush to the bottom of the beam with 16d nails that are staggered and not over 12 inches apart.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-IX-1 - an exciting show!
2. Read and study pages 115 - 117 in Modern Carpentry, ending with the section entitled Posts and Columns.
3. Read pages 57 - 64 in Fundamentals of Carpentry, Volume II, ending with the section entitled Doubling Joists, at the top of page 64.
4. This finishes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 16d nails
3. Crosscut saw or electric circular saw
4. 2" x 8" stock
5. 2" x 2" stock
6. Combination square
7. Pencil

1. Study the specifications provided by your instructor, as they apply to the floor beam or girder for the house.
2. Construct the floor beam according to the specifications, so that the beam is three 2" x 8" boards thick, with two 2" x 2" ledger strips attached (see pages 115 - 117, and figure 7-16, page 119 in Modern Carpentry).
3. In constructing the beam, make sure that the joints are staggered so they will be supported by a post or pier and the beam is assembled with 16d nails that are staggered, and not over 16" apart.

LEARNING PRACTICE (cont'd):

4. The 2" x 2" ledger strips should be attached flush with the bottom of the beam with 16d nails that are staggered and not over 12" apart.
5. When installed, the bottom of the beam should be level with the bottom of the floor joists and with the top of the piers, and the crown should be in the up position.
6. When you are satisfied that the beam has been properly constructed and installed, report to your instructor.
7. If your job was completed in a satisfactory manner, you will be directed to the next task package.
8. Let your face light up with a beam as you begin the next task package.

UNIT I[illegible] FLOOR FRAMING FOR A HOUSE

TASK PACKAGE 2: FLOOR JOISTS

PREREQUISITES: UNITS I-VII; UNIT IX, TASK PACKAGE 1

RATIONALE:

You've heard about medieval knights who went jousting. Now, a joust is not a joist, but you should enjoy going joisting in this package.

After construction of the beam or girder the carpenter will proceed to cut and install the floor joists, which normally rest on the ledger strip of the beam and in the foundation wall. However, on the house you are constructing, the joists rest on the ledger strips and directly on the pillars, or are supported by cross members called headers. In this task package you will learn how to cut and properly install floor joists in accordance with plans and specifications provided by your instructor. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install floor joists in accordance with plans provided by your instructor to the following standards:

a. Joists are cut to the correct length (±1/16").

b. Joists are positioned on 16" centers (±1/16").

c. Joists' crowns are installed in the up position.

d. Floor joists are nailed properly.

e. Double joists are positioned under load-bearing partitions.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-IX-2, today's super special.
2. Read pages 121-126 in Modern Carpentry, beginning with section entitled Joists and ending with Bridging.
3. Read pages 61-66 in Fundamentals of Carpentry, Volume II, ending with the section entitled Rough Flooring.
4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 16d nails
3. Cross cut saw or electric circular saw
4. 2" x 8" stock
5. Framing square
6. Combination square
7. Pencil
8. Folding wood rule
9. 100' layout tape

1. According to the plans provided by the instructor, lay out the position for the joists, 16" on centers, on the beam and on the header. (See figures 7-24 and 7-27, pages 121-122 in Modern Carpentry.)

2. Lay out and cut the joists to the correct length. Cut double joists where they are required under load bearing partitions or around an opening. (See figures 7-26, 7-28, and 7-31, pages 122-123 in Modern Carpentry.)

3. Notch out joists to fit on the ledger strips of the beam so that the top and bottom of the joists are flush with the top and bottom of the beam. (Similar to figure 7-16, page 119 in Modern Carpentry and figure 11, page 62, in Fundamentals of Carpentry, Volume II.)

4. Nail double joists together following procedure shown in figures 7-29 and 7-30, page 123 in Modern Carpentry.

LEARNING PRACTICE (cont'd):

5. Nail joists in place on the beam and attach them to the header as shown in figure 7-31, on page 123 of Modern Carpentry.

   Note: Make sure the joists' crowns are installed in the up position.

6. Attach double header as shown in figure 7-35, page 126 in Modern Carpentry.

7. After you have completed the job evaluate yourself according to the objective and then ask your instructor for his evaluation.

8. When satisfied with your completed work, the instructor will indicate that you should begin the next task package.

   Did you hear of the student that thought a double header in a house was two games of baseball played in the living room during the same afternoon?

   Looks as if you closed the gap between the floor beam and piers, and you're rapidly closing the gap in your knowledge of carpentry techniques.

UNIT IX: FLOOR FRAMING FOR A HOUSE

TASK PACKAGE 3: BRIDGING

PREREQUISITES: UNITS I-VII; UNIT IX, TASK PACKAGES 1 & 2

RATIONALE:

Do you cross your bridges before you get to them? Some people try to do so. But here you've already gotten to this task package on bridging, so go ahead and cross it.

In order to assure that the floor joists remain in place with a uniform space between them, the carpenter installs solid or cross bridging. This practice also keeps the joists from moving and makes them more rigid. In this task package you will learn how to properly cut and install solid and cross bridging between joists, following plans and specifications. This task is not a difficult one but necessary for proper house construction. Continue by reading the Objective and doing the Learning Activity and the Learning Practice. You will certainly be able to bridge the gap between joists with this task package.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install solid and cross bridging between joists on a residential floor from drawings provided by your instructor to the following standards:

a. bridging has been properly cut with respect to length and angle of cut (± 1/16").

b. bridging has been properly nailed to the joists.

c. floor joists are straight and plumb after bridging has been installed (± 1/16").

d. bridging has been properly placed in accordance with plans and specifications.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-IX-3, a first-run feature.
2. Read and study pages 126-128 about Bridging in Modern Carpentry.
3. Read pages 68-71 in Fundamentals of Carpentry, Volume II, the section entitled Bridging.
4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d nails
3. Framing square
4. Combination square
5. Electric circular saw or radial arm saw
6. Pencil
7. Chalk line and chalk
8. Stock for solid and cross bridging

1. Read plans carefully to determine location of bridging, noting that bridging is placed at intervals of no more than 6 feet apart.
2. It is required that both solid and cross bridging be installed.
3. Lay out the location of the bridging and chalk a line on the top of the joists indicating how the bridging will run. (Secure the help of the instructor or a fellow student when chalking the line.)
4. For the cross bridging, lay out the stock in the manner shown in figure 7-36, page 126, in Modern Carpentry.
5. For the solid bridging, lay out the stock the length between the joists.
6. Cut the solid and cross bridging according to procedure outlined in Modern Carpentry, pages 126-128.

LEARNING PRACTICE (cont'd):

7. Install solid and cross bridging following the procedure outlined in Modern Carpentry, pages 126-128, and illustrated in figures 7-37 and 7-38.

8. When you have checked your finished work against the Objective and determined that it is satisfactory, indicate to your instructor that you are ready for his evaluation.

9. If your finished job meets acceptable standards you will be directed to the next task package.

Whether you used solid or cross bridging, you certainly were able to bridge a large gap.

UNIT IX: FLOOR FRAMING FOR A HOUSE

TASK PACKAGE 4: SUBFLOOR

PREREQUISITES: UNITS I-VII; UNIT IX, TASK PACKAGES 1-3

RATIONALE:

The subfloor of a house is not to be confused with the subway. The subway runs under the city, but the subfloor runs under the main floor. "Sub" means "under" here - don't let this package put you under!

After the carpenter has installed the beam or girder, the floor joists and headers, and the bridging, he must next apply the subfloor to cover the joists and prepare the surface for further construction. The subfloor covering is usually applied by one of two methods. The carpenter may run the subflooring material diagonally across the joists or at right angles across the joists. Boards of 6" to 8" widths are often used; some of these boards have grooved edges while others do not. Quite a common practice today is to use plywood as subflooring material. Plywood's advantages are that it can be installed rapidly and it usually insures a squeak-free floor. In this task package you will learn how to apply subfloor to the joists and how to properly nail this floor in place. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install the subfloor in a residential structure from specifications provided by your instructor to the following standards:

a. joints of subfloor material are aligned with centers of floor joists (± 1/16").

b. joints of subfloor materials are properly staggered.

c. subfloor material is properly nailed to joists.

d. subfloor joints are tight (space in joints does not exceed 1/8" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-IX-4. It's better than TV.
2. Read and study pages 131 and 132 in Modern Carpentry, the section entitled Subfloors.
3. Read Fundamentals of Carpentry, Volume II, pages 66-68 about Rough Flooring.
4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 1" x 6" square edge stock
3. 8d nails
4. Cross cut saw
5. Electric circular saw
6. Framing square
7. Combination square
8. Pencil

1. Diagonally aligned subflooring is to be applied to the joists by using 1" x 6" square edge boards and nailing with 8d nails. (See figure 7-46, page 132 in Modern Carpentry for an illustration of this process being performed.)

2. In beginning, start some distance from a corner, aligning the first board 45° to the joists.

3. Mark and saw the ends of this board so that the 45° angles are aligned with the center of the thickness of the two joists on which the joint falls.

   Note - It is considered good practice to let ends extend out over walls and openings and then saw them off after the boards have been nailed in place.

4. Nail three 8d nails through the board at each joint.

5. Lay the next board in place (away from the corner); cut the angles; butt the edges together tightly and nail in place as before.

   Note - take care that joints on the ends of adjacent boards do not occur on the same joist.

LEARNING PRACTICE (cont'd):

6. Apply additional boards, fitting them into position by placing their edges and/or ends against stock already nailed in place.
7. After considerable short cuttings of stock have accumulated, begin laying boards back to the corners, following the procedure already outlined.
8. After the subfloor has been installed, check your work against the Objective and then report to your instructor for his evaluation.
9. If your finished job has been done in a satisfactory manner, you will be directed to the next task package.

You sure can cut corners - when it comes to installing subfloors, that is! Good for you!

UNIT IX: FLOOR FRAMING FOR A HOUSE

TASK PACKAGE 5: SHOE (SOLE PLATE)

PREREQUISITES: UNITS I-VII; UNIT IX, TASK PACKAGES 1-4

RATIONALE:

No, you're not exactly in a shoe shop. Nor does this course train you to repair shoes. But in carpentry, as this package indicates, a list of shoe-shop terminology enters the picture. So put on your action shoes for the sole purpose of attaching the plates.

After the sub floor has been attached, the next step in building a house is to lay out the plates. The plates are the top and bottom 2 x 4's of a wall; the bottom one is called the shoe or sole plate and the top one is known as the top plate. Two practices are followed in laying out these plates--one is when both plates are laid out at the same time, and the other (which you will use) when the bottom plate (shoe) is cut, marked, and installed separately. In the latter case the top plate will later be placed against the shoe and marked in a similar manner. In this task package you will learn how to cut, mark, and install shoe (sole plate) in compliance with specifications and drawings furnished to you. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut, mark, and install shoe (sole plate) in a residential structure from a drawing provided by your instructor to the following standards:

a. shoe is correct length (± 1/32").

b. openings are properly laid out (± 1/16").

c. partitions are properly laid out (± 1/16").

d. shoes are straight and are correctly nailed.

e. trimmer and cripple studs are properly marked.

f. studs are laid out 16" on centers (± 1/16").

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-IX-5. It's better than a TV show.
2. Read and study carefully pages 135-140 in Modern Carpentry. Note particularly the section entitled Plate Layout, pages 139 and 140. Discuss with a fellow student the procedure to be followed when laying out the plate.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Combination square
3. 16d nails
4. 2" x 4" stock
5. Framing square
6. Electric circular saw
7. 100' layout tape
8. Plans of house
9. Crosscut saw

1. Discuss the layout of the shoe with the instructor, secure the above tools and equipment, and proceed to the building site.
2. Select straight 2 x 4's and lay them out along the perimeter of the floor with one 4" face down. Layout the shoe (sole plate) along the main side walls first.
3. Align the ends with the floor frame and then mark the regular stud spacing (16" on centers) all the way along the shoe. (See figure 8-10, page 139, in Modern Carpentry for regular stud layout.) Nail the shoe in place using 16d nails. Note-- The regular stud layout spacing is continuous along the wall, regardless of openings, so that modular wall-surface materials can be applied with a minimum of cutting.
4. Study the set of plans to learn the size and position of the rough openings (R.O.). Lay out the center lines for each door and window opening and then mark off the shoe indicating the location

LEARNING PRACTICE (cont'd):

of the trimmer studs with a (T), the cripple studs with a (C), and the full studs with an (X). (See figure 8-10, page 139, in Modern Carpentry for an illustration of this process and page 140, first column, for the explanation on how to lay out these studs.)

[illegible] center lines for intersecting partitions, marking location of the studs. Plan the layout of wall corners carefully (see figure 8-10, page 139, in Modern Carpentry).

6. Follow the foregoing procedure in laying out the shoe for all the outside walls and partitions in the house. Nail all the shoe in place but do not cut the shoe at any of the door openings at this time; it will be cut later.

7. When you have checked your layout against the Objective and are satisfied you have met the standards, report to the instructor for his evaluation.

8. Upon satisfactory completion of this job you will be directed to the next unit.

When you mention shoe most people think of something you wear instead of something you cut, work on, or drive nails into. Carpentry needs creative individuals like you.

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
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SANFORD, NORTH CAROLINA 27330

CLUSTER: CARPENTRY
COURSE: CARPENTRY

CE003729

UNIT PACKAGE X: WALL FRAMING FOR A HOUSE

PREREQUISITES: UNITS I-VII; UNIT IX

RATIONALE:

In the house you are constructing, thus far you have installed the floor beam with ledger strips, floor joists, bridging, subfloor, and base shoe; now is the time to begin the installation of the wall framing. In constructing the wall framing you will begin by cutting full length and cripple studs to the proper length, then construct wall corners and "T's" for intersecting walls, and window and outside door headers. You will also install top plates, double plates, bracing, ceiling joists, and purlins, in addition to constructing headers for inside doors and case openings. In order to accomplish these tasks you will have to study and work hard; however, you have already demonstrated you can do this - therefore, you should experience no additional problems.

Continue by reading the General Objective for the unit and the Specific Objective for each task package within the unit. Next, read the Learning Activity, which explains what you are to do in this unit and how you are to go about performing the tasks.

OBJECTIVE:

GENERAL:

Upon completion of this unit you will be able to cut, construct and install the wall framing for a house.

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Select and cut full length and cripple wall studs in accordance with a drawing provided by your instructor to the following standards:
   a. length of full studs nailed in place will provide for 8'1/2" clearance (± 1/16") between the ceiling and the second wooden floor covering.
   b. length of cripple studs according to the specifications (± 1/16").
   c. all stud lengths ± 1/16" from the original pattern.
2. Construct corners for walls according to plans and specifications for a residential structure and also using the model of corners provided by your instructor. You will be evaluated on the following:
   a. corner studs are of the correct length (± 1/16").
   b. corners are correctly positioned (± 1/16").
   c. studs are straight and are nailed together properly for

outside cornerpost.

Your performance will be evaluated in accordance with the instructor's checklist.

3. Construct T's for intersecting walls based on plans, specifications, and a model provided by your instructor.

You will be evaluated on the following:

a. T's are of the correct length (± 1/16").

b. T's are correctly positioned (± 1/16").

c. studs are straight and are nailed together properly for proper assembly of T's.

Your performance will be evaluated in accordance with the instructor's checklist.

4. Construct window and outside door headers according to plans and specification for a residential structure, to the following standards:

a. headers are of the correct length (± 1/16").

b. double header with spacers is correctly constructed.

c. headers are properly positioned and nailed.

Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

5. Mark, and install top plates for studs, openings, and partitions according to plans and specifications for a residential structure, maintaining the following standards:
   a. top plates are of the correct length (± 1/16").
   b. top plates are placed against and marked the same as the shoe (sole plate).
   c. top plate joints are positioned on center of studs.
   d. studs are correctly positioned and nailed to shoe and top plates (± 1/16").
   e. corners are plumb (± 1/16"), and properly tied with temporary diagonal bracing.
   f. top plates are straight (± 1/16") and secured by braces from the floor.

   Your performance will be evaluated in accordance with the instructor's checklist.

6. Cut and install double plates for walls and partitions according to plans and specifications for a residential structure, maintaining the following standards:
   a. double plates overlap the wall top plates to tie corners together.
   b. outsides of double plates are nailed evenly.

OBJECTIVE (cont'd)

c. partition double plates overlap wall top plates.

d. double plates are nailed to top wall plates with 16d nails not exceeding 16" apart.

e. nails are staggered from side to side in all cap plates.

Your performance will be evaluated in accordance with the instructor's checklist.

7. Cut and install bracing in the wall structure of a residential building according to plans and specifications, maintaining the following standards:

a. bracing is correctly cut according to angle and length (± 1/16").

b. bracing is correctly positioned and nailed.

Your performance will be evaluated in accordance with the instructor's checklist.

8. Cut and install ceiling joists in a residential structure according to plans and specifications, maintaining the following standards:

a. ceiling joist layout on 16" centers (± 1/16").

b. ends of ceiling joists are correctly cut to fit rafters.

c. ceiling joists are properly nailed (correct fasteners and spacing).

d. ceiling joists run according to plans and specifications (± 1/16").

OBJECTIVE (cont'd):

e. crowns of joists are turned up.

f. size and span of ceiling joists comply with the requirements as specified in Figure 8-36, page 152, in Modern Carpentry.

g. ceiling backing is installed and nailed correctly.

Your performance will be evaluated in accordance with the instructor's checklist.

9. Install purlins in the wall structure of a residential building according to plans and specifications, maintaining the following standards:

a. purlins are correctly cut as to length (± 1/16").

b. purlins are installed with their alternating bottoms and tops at the 48" level above the subfloor.

Your performance will be evaluated in accordance with the instructor's checklist.

10. Construct headers for inside doors and case openings in the wall structure of a residential building according to plans and specifications, maintaining the following standards:

a. headers are of the correct length (± 1/16").

b. double header with spacers is correctly constructed if needed for a load bearing wall.

c. headers are properly positioned and nailed.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit, on Wall Framing for a house, consists of ten task packages which should be completed in numerical order. You should note that the prerequisites for this unit consist of Units I-VII and Unit IX. As you perform the required work in each task package you will view a sound-slide package, do readings, answer questions, and complete other construction activities as directed.

The titles of the task packages within this unit are:

TASK PACKAGE 1: WALL STUDS
TASK PACKAGE 2: WALL CORNERS
TASK PACKAGE 3: T's FOR INTERSECTING WALLS
TASK PACKAGE 4: WINDOW AND DOOR HEADERS
TASK PACKAGE 5: TOP PLATES
TASK PACKAGE 6: DOUBLE PLATES
TASK PACKAGE 7: BRACING
TASK PACKAGE 8: CEILING JOISTS
TASK PACKAGE 9: FURRING
TASK PACKAGE 10: HEADERS FOR [illegible] AND CASE OPENINGS

If, after reading the unit package, you determine that you can pass a comprehensive test over the information covered in this unit, you should request the examination from the instructor. If, however, you are not ready to be tested, begin work on the task packages as previously indicated.

C-X-1

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 1: WALL STUDS

PREREQUISITES: UNITS I-VII; UNIT IX

RATIONALE:

You don't want to become a flim-flam man, and you don't wish to put up flimsy frames, either. For flimsy frames might flop down on you. So begin the study of framing here with a package on wall studs.

In the construction procedures used in building the house you are working on, the next step is to cut full length and cripple studs to the proper length. In order to perform this task you must read the drawings provided by the instructor to determine the correct stud length based on the ceiling height and the height of door and window openings. In this task package you will learn how to select and cut full length and cripple studs in accordance with a drawing provided. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to select and cut full length and cripple wall studs in accordance with a drawing provided by your instructor to the following standards:

a. length of full studs nailed in place will provide for 8' 1/2" clearance (± 1/16") between the ceiling and second wooden floor covering.

b. length of cripple studs according to the specifications (± 1/16").

c. all stud lengths (± 1/16") from the original pattern.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-1, a four-star production.
2. Read and study pages 140-142 in Modern Carpentry, beginning with the article entitled Master Stud Layout and ending with Erecting Wall Sections.
3. This concludes the Learning Activity; start, now, on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. 2" x 4" stock
2. Cross cut saw
3. Portable circular saw
4. Framing square
5. Combination Square
6. Folding wood rule

1. Report to your instructor and you will be issued the above materials.

2. Reading the plans, determine the lengths of the full and cripple wall studs for both inside and outside walls. (See figure 8-8 for an illustration of full [regular] and cripple studs.)

3. Cut the full studs to allow for 8' - 1/2" clearance from underlayment board (5/8" thick) to the underside of sheet-rock ceiling (1/2" thick). What length did you figure? The answer is 7' - 9 1/8". Therefore, cut full studs a length of 7' - 9 1/8".

4. Note - In modern construction, it is seldom necessary to cut standard full-length studs. These are usually pre-cut and delivered ready to assemble. If they are already cut to length your instructor provided the mill with the proper length of studs for your house.

5. Cut the cripple studs to the correct length, referring to the plans for the dimensions.

6. Cut trimmer studs to the proper length, referring to the plans for the exact measurements.

[illegible]

7. Mark these ends and place all of them aside until later, when they will be used in the walls. You will be given instructions in another task package as to when and how to install them.

8. If you are satisfied that your work conforms to the standards in the Instruction, ask the instructor for his evaluation.

9. You will be directed to the next task package if your finished job has been completed satisfactorily.

[illegible] for this task package [illegible]

From here, it looks as if you're framing yourself a career in carpentry.

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 2: WALL CORNERS

PREREQUISITES: UNITS I-VII; UNIT IX; UNIT X, TASK PACKAGE 1

RATIONALE:

Oftentimes in life two different people come together - like a flim-flam man and a gullible person, for instance. In carpentry, two walls often come together; and, when they do, you don't want to build a flimsy corner post.

When two walls come together and form a corner the carpenter must be able to construct a corner post. There are several types of posts that may be built; however, they all have similar characteristics. All types of corner posts serve to make the corners stronger, attach the wall together, and furnish a surface on the inside corner of the room where the wall covering may be attached. In this task package you will learn how to construct a wall corner which with slight modification can be used as the structural member for intersecting walls. Continue, now, by reading the Objective and performing the Learning Activity and the Learning Practice.

[illegible]

Upon completion of this task package you will be able to construct corners for walls according to plans and specifications for a residential structure and [illegible] the model of corners provided by your instructor. You will be evaluated on the following:

a. Corner studs [illegible] (1/16").

b. Corners are correctly positioned [illegible] 1/16").

c. Studs are straight and are nailed together properly for outside corner post.

Your performance will be evaluated in accordance with the instructor's checklist.

[illegible]

1. [illegible] package [illegible]
2. Read and study page [illegible] the section [illegible]
3. Read pages 70-73 in [illegible] the section entitled Corner [illegible]
4. This completes the [illegible]

[illegible]

[illegible]

Tools and Equipment

1. Hammer
2. [illegible]
3. Model of corner post
4. Combination square
5. Folding wood rule
6. [illegible]
7. 2" x [illegible]
8. [illegible]
9. [illegible]
10. House plans

1. Referring to the house plans, determine the length of the corner posts.

2. Study the model of the corner post provided by the instructor in order to understand the construction procedures involved. (Note -- This is only one kind of corner post that may be constructed; however, with a slight change in procedure a "T" for intersecting wall can be built.)

3. To construct a corner post similar to the model, select three straight and true 2" x 4"'s long enough to construct the corner post. Also select three short 2" x 4"'s approximately 16" long.

4. Attach two 2" x 4"'s together to form an inside corner, using the three 16" x 2" x 4" blocks in the manner shown on the model. (Note -- 16d nails are used in the construction with their positions being alternated as shown.)

5. Attach the third 2" x 4" in place, following the procedure shown.

LEARNING PRACTICE (cont'd):

on the model.

6. This completes your 2" x 4" corner, and the construction of all outside corner posts can follow the same procedure.
7. Check your finished work against the Objective and the model to make sure it meets the standards; when satisfied ask the instructor for his evaluation.
8. If your finished job has been completed in a satisfactory manner, you will be directed to the next task package.
9. Save these 2" x 4" corners, as they will be used later in the construction of the walls.
10. Move out of the corner and begin the next task package.

Becoming a competent carpenter is like climbing a mountain; you work your way upward to reach the height.

C-X-3

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 3: T's FOR INTERSECTION WALLS

PREREQUISITES: UNITS I-VII; UNIT IX; UNIT X, TASK PACKAGES 1 & 2

RATIONALE:

In learning carpentry, you're a little like a football player or coach. Football players and coaches have to deal with the "T" formation - and so does the carpenter. Therefore, you'd better get on out into the field and work on your own "T" formation.

Do you remember constructing the wall corners in task package 2 of this unit? In that package it was indicated that, with slight modification in procedure, a "T" could be made for intersecting walls by changing the location of only one 2 x 4. Sound interesting? Not only interesting, but practical as well, because it makes remembering how to construct corners and "T's" much easier. In this task package you will learn how to construct "T's" for intersecting walls, using plans and specifications and a model furnished by your instructor. Ready to begin? OK. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to construct "T's" for intersecting walls based on plans, specifications, and a model provided by your instructor, maintaining the following standards:

a. T's are of the correct length (± 1/16").

b. T's are correctly positioned (± 1/16").

c. studs are straight and are nailed together properly for proper assembly of T's.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-3, a modern extravaganza.
2. Read page 137 in Modern Carpentry and study figure 8-5.
3. This completes the Learning Activity; begin the Learning Practice.

[illegible]

Tools and Equipment

1. Hammer
2. Nail holder
3. [illegible] tape
4. [illegible]
5. Combination square

6. [illegible]
7. [illegible]
8. [illegible]
9. [illegible]
10. [illegible]

1. [illegible]

2. [illegible]

3. [illegible]

4. [illegible]

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LEARNING ACTIVITIES (cont'd)

6. This completes your 2 x 4 "T" for intersecting walls; all "T's" follow the same construction procedure.

7. Compare your finished job with the Objectives and the model to see if it meets the standards. When satisfied, request the instructor's evaluation.

8. If your completed work was done in a satisfactory manner, you will be directed to the next task package.

9. Save these 2 x 4 "T's" for the intersecting wall because they will be used in later construction.

10. "But your work sure suited your instructor to a "T".
As quarterback on this assignment, you succeeded in mastering the "T" formation."

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[illegible]

[illegible]

[illegible]

[illegible]: WRITE [illegible] UNIT X, TASK PACKAGES 1-3

[illegible]

[illegible] people who head for the [illegible] and [illegible] "[illegible] door headers"? Well, that's [illegible] passage.

[illegible] supported by the ceiling and roof [illegible] The carpenter realizes that he has to provide additional support [illegible] these openings. This additional support is provided by [illegible] called headers, which are formed by nailing [illegible] together and then [illegible] placed [illegible] in [illegible] between [illegible] the [illegible] planks [illegible] [illegible] the [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

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OBJECTIVE:

Upon completion of this task package you will be able to construct window and outside door headers according to plans and specifications for a residential structure, to the following standards:

a. headers are of the correct length (± 1/16").

b. double header with spacer is correctly constructed.

c. headers are properly positioned and nailed.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-4, which heads today's bill.
2. Read and study pages 137-139 in Modern Carpentry, the section entitled Rough Openings.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 16d nails
3. Crosscut saw
4. Portable electric saw
5. Combination square
6. Framing square
7. Pencil
8. 2" x 8" or 2" x 10" stock
9. 3/8" plywood spacing material

[illegible]

1. Study the [illegible] to determine the size of the headers [illegible]. Also check page 137 in [illegible] to help you determine the [illegible] to be used in the headers.
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]
7. [illegible]
8. [illegible]

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LEARNING PRACTICE (cont'd):

9. Place the headers aside at this time, as they will be used later.

   You surely used your head in constructing the headers. Congratulations!

   It appears that you're heading for a fine career in carpentry.

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 5: TOP PLATES

PREREQUISITES: UNITS I-VII; UNIT IX; UNIT X, TASK PACKAGES 1-4

RATIONALE:

Up to now, you have done well. You haven't crippled yourself with cripple wall studs, walled yourself into a wall corner, or split the "T" formation. Also, you've had a good head for window and door headers. Now, top these things off with some top plates.

In this unit, thus far, you have laid out and cut full length and cripple wall studs, you have constructed outside wall corners, you have constructed "T's" for intersecting walls, and finally you laid out and constructed window and outside door headers. In this task package you will learn how to cut, mark, and install top plates. In addition you will attach the studs, the corners, the "T's", and headers in place so that this wall may be erected and properly placed upon the shoe (sole plate). In completing task packages 1-4 in this unit, you cut and assembled many structural members and then placed them aside for later use. Now is the time for all good structural members to come to the aid of a solid wall. Continue, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut, mark, and install top plates for studs, openings, and partitions according to plans and specifications for a residential structure, maintaining the following standards:

a. top plates are of the correct length ($\pm$ 1/16").

b. top plates are placed against and marked the same as the shoe (sole plate).

c. top plate joints are positioned on center of studs.

d. studs are correctly positioned and nailed to shoe and top plates ($\pm$ 1/16").

e. corners are plumb ($\pm$ 1/16") and are properly tied with temporary diagonal bracing.

f. top plates are straight ($\pm$ 1/16") secured by braces from the floor.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-5, a terrific show.
2. Read and study pages 139-147 in Modern Carpentry, beginning with the section entitled Plate Layout and ending with the section named Bracing.
3. This completes the Learning Activity; begin, now, on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d, 10d, and 16d nails
3. Combination square
4. Framing square
5. Carpenter's level
6. Folding wood rule
7. 2" x 4" stock
8. Structural members previously cut
9. Material for bracing

1. Align the 2" x 4" stock against the shoe (sole plate) which is already nailed in place on the subfloor. Lay out the top plate so that it exactly matches the shoe. (See figure 8-10, on page 139 in Modern Carpentry for an illustration of this procedure.)
2. Place the top plate on edge on the subfloor about a stud's length away from the shoe and with the layout marks inward. Also place full-length studs, which were previously cut, at each position where specified. (See figure 8-12, page 141, in Modern Carpentry for a picture showing this.)

LEARNING PRACTICE (cont'd):

3. Nail the studs to the top plate, using two 16d nails at the end of each stud.
4. Set trimmer studs, already cut, in place and nail them to the full-length studs. (Follow the procedure outlined on page 141 in Modern Carpentry.)
5. Place headers in position so that they are tight against the end of the trimmer, and nail through the full-length studs into the header, using 16d nails. (See figure 8-13 in Modern Carpentry.) Install the upper cripple studs after the header is in place. (See figure 8-13.)
6. For the window openings, nail the rough sill in place and then nail the cripple studs to the rough sill, using 16d nails. (See figure 8-8 on page 138 in Modern Carpentry.)
7. Nail "T's" in place, attaching them with 16d nails to the top plate.
8. Nail corners in place, using 16d nails through the top plate.
9. Attach temporary braces to the top of the corners of the wall as shown in figure 8-17, page 143, in Modern Carpentry.
10. After securing ample help, erect and place the constructed wall upon the shoe (sole plate). (See figure 8-17, page 143, in Modern Carpentry.

LEARNING PRACTICE (cont'd):

11. Toenail all the studs to the shoe, using method illustrated in figure 8-14, page 141, of Modern Carpentry.
12. Plumb the wall using the carpenter's level and a straight edge as pictured in figure 8-18, page 143, of Modern Carpentry.
13. Nail the temporary braces in place to keep the wall plumb. (See figure 8-17, page 143, and figure 8-19, page 144, in Modern Carpentry.)
14. Assemble the remaining walls, raise them into place, nail them, and brace them as before. (See figures 8-17, 8-19, 8-20, and 8-21 in Modern Carpentry for these procedures.)
15. This completes your work in this package. Check your finished job against the standards set forth in the Objective. If you have completed the work satisfactorily, ask the instructor for his evaluation.
16. Upon satisfactory completion of this task, as judged by the instructor, you will be directed to the next task package. For this task package you need several pats on the back! So why don't you give yourself about five pats? Just keep hanging loose, and you'll become a topnotch carpenter.

C-X-6

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 6: DOUBLE PLATES

PREREQUISITES: UNITS I-VII; UNIT IX; UNIT X, TASK PACKAGES 1-5

RATIONALE:

Double your pleasure, double your fun. Work on these double plates and see how it's done.

After both the inside and outside walls have been erected, the carpenter must now install the double plates in place. Double plates are not two home plates on a baseball diamond; rather they are a series of 2 x 4's properly placed upon the top plates of a wall. The correct positioning and nailing pattern used is very important in forming the walls into an integrated, solid unit. Want to find out how it's done? Good news, because in this task package you will learn how to install double plates for walls and partitions according to plans and specifications. Let's get on with the plates by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install double plates for walls and partitions according to plans and specifications for a residential structure maintaining the following standards:

a. double plates overlap the wall top plates to tie corners together.

b. outsides of double plates are nailed evenly.

c. partition double plates overlap wall top plates.

d. double plates are nailed to top wall plates with 10d nails not exceeding 16" apart.

e. nails are staggered from side to side in all cap plates.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-5. Although you viewed this package before, review it again since it also shows the installation of double plates. There's nothing else like a rerun!

2. Read and study page 148 in Modern Carpentry, the section entitled Double Plate.

LEARNING ACTIVITY (cont'd):

3. Read page 73 in Fundamentals of Carpentry, Volume II, and refer to figure 29 on page 74.
4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

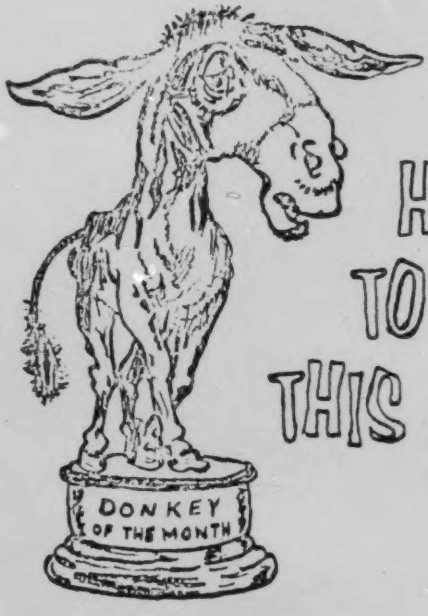
1. Hammer
2. 10d nails
3. Combination square
4. Crosscut saw
5. Portable electric saw
6. Long 2 x 4 stock
7. Folding wood rule
8. Pencil

1. Using a substantial ladder on which to stand, begin applying the double plates as follows:
   a. Select long, straight 2 x 4's.
   b. Install the double plate with 10d nails; two nails near the ends of each piece and the others staggered 16" apart. (See figure 8-28 on page 148 in Modern Carpentry.)
   c. In the installation of the double plates, make sure that they overlap the wall top plates to tie the corners together. Also, take care to install the partition double plates so that they will overlap the wall top plates. (Study figure 8-29, page 148, in Modern Carpentry for illustrations of

LEARNING PRACTICE (cont'd):

these procedures. Refer, also, to Fundamentals of Carpentry, Volume II, figure 29, page 74, for a picture showing these processes.)

2. When you have installed the double plate completely, evaluate your work in terms of the Objective.
3. When ready, seek the instructor's evaluation.
4. If you have performed the job in a satisfactory manner, you will be directed to the next task package.
5. You've been in carpentry class now for some time; do you know of anyone in your class who should get the attached award?



HOW TO WIN THIS AWARD

1. Run on stairways.
2. Ignore oil spills.
3. Engage in horseplay.
4. Wear long hair and loose clothing.
5. Use makeshift ladders.
6. Use ungrounded electrical tools.
7. Fail to use machine guards and eye protection.

NATIONAL SAFETY COUNCIL ■ 0484-A

You have the right to bray a little while about your success thus far; then go on to the next task package.

C-X-7

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 7: BRACING

PREREQUISITES: UNITS I-VII; UNIT IX; UNIT X, TASK PACKAGES 1-6

RATIONALE:

Brace up! You're about to begin the study of bracing. Bracing adds strength in carpentry, and this package will strengthen your knowledge of carpentry.

At this stage of construction your inside and outside walls have been assembled together and the double plates nailed in place. The walls are fairly rigid at this point; however, the outside wall needs to be strengthened even more. The type of bracing that will be used is diagonal or let-in bracing. The procedure is to cut slots in the 2 x 4 studs into which the bracing is placed and nailed. This type of bracing is not too difficult to apply and adds to the strength of the finished structure. In this task package you learn how to cut and install diagonal bracing in a wall. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install bracing in the wall structure of a residential building according to plans and specifications, maintaining the following standards:

a. bracing is correctly cut according to angle and length (± 1/16").

b. bracing is correctly positioned and nailed.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-7; C this X-7 rated feature.
2. Read and study page 147 on Bracing in Modern Carpentry.
3. Discuss kinds and uses of wall braces with a fellow student. Explain to him the procedure you would follow in installing diagonal (or let-in) bracing.
4. This conclude the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 10d nails
3. Cross-cut saw
4. Folding wood rule
5. Portable electric circular saw
6. Chisel
7. Pencil
8. 2 x 4 stock

1. Survey the wall situation, noting such things as window and door openings and other structural features.
2. In installing diagonal or let-in bracing, run the 2 x 4 brace from the sole plate (shoe) to the top plate if at all possible. However, in many cases it is not feasible or possible to do this. The bracing may run diagonally but for a much shorter length. (See figure 8-27, page 147 in *Modern Carpentry*). It should connect at least three studs, though.
3. On your house you will install the bracing on the *room side* of the outside walls.
4. Make the braces from 2 x 4 lumber cut to the correct length with an angle at the bottom and top ends.
5. Select one wall, and tack (nail temporarily) each brace in position and mark the layout on each stud.
6. Remove the brace and gauge the depth of cut so that the brace will fit flush with the studs. Make the side cuts with a saw and remove the wood between the cuts with a chisel.

LEARNING PRACTICE (cont'd):

7. After all slots have been chiseled, replace the brace in the slots, making sure it fits flush with the studs, and nail two 8d nails at each stud.
8. This same procedure may be followed in installing all of the let-in bracing in the outside walls.
9. When the bracing has all been installed and you are ready for evaluation, report to your instructor.
10. After you have been evaluated and if you have completed your work in a satisfactory manner, you will be directed to the next task package.

You did well on this package. Now brace yourself for the next job.

Don't you find success with bracing to be a bracing experience?

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 8: CEILING JOISTS

PREREQUISITES: UNITS I-VII; UNIT IX; UNIT X, TASK PACKAGES 1-7

RATIONALE:

Earlier, you became acquainted with joists on a lower level - the floor level. But joists, like yourself, can rise to higher levels. The ones in this assignment are at ceiling level, and some day you will reach your ceiling as a carpenter.

After the walls have been "tied" together with the double plate and braced by using diagonal let-in bracing, many carpenters install the ceiling joists next. These joists are similar to the floor joists, except they are not usually heavy timbers because they are not required to support the loads that the floor joists do. The primary purposes of ceiling joists are to furnish a surface on which to attach a ceiling and to give support for an attic if it is required. In this task package you will learn how to cut and install ceiling joists according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install ceiling joists in a residential structure according to plans and specifications and success will be determined by maintaining the following standards:

a. ceiling joist 16" on centers (± 1/16").

b. ends of ceiling joists are correctly cut to fit rafters.

c. ceiling joists are properly nailed (correct fasteners and spacing).

d. ceiling joists run according to plans and specifications (± 1/16").

e. crowns of joists are turned up.

f. size and span of ceiling joists comply with the requirements specified in figure 8-36, page 152, in Modern Carpentry.

g. ceiling backing is installed and nailed correctly.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-8.
2. Read and study the section entitled Ceiling Frame, pages 152-154 in Modern Carpentry.

LEARNING ACTIVITY (cont'd):

3. This completes the Learning Activity; begin, now, on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 10d nails
3. 100 foot layout tape
4. Folding-wood rule
5. Combination square
6. Framing square
7. Crosscut saw
8. Portable electric circular saw

1. Check the plans of the house to determine location and size of the ceiling joists; most likely the joists will be spaced apart 16" on centers and timbers 2 x 10 inches will probably be used.
2. Ceiling joists usually run across the narrow dimensions of the structure, which is the case on your house.
3. Using the 100 foot layout tape and pencil, layout the double plate 16" on centers so that the ceiling joists may be lined up on these marks.
4. Select and cut to length the number of joists needed.
5. Layout and cut the ends of the ceiling joists to match the angles of the rafter. (If the rafter is to be cut at this time.)
6. Place the joists in position (on the 16" spaced center lines) on their edges with the crowns up.

LEARNING PRACTICE (cont'd):

7. Toe-nail to the double plate each joist on both ends using 10d nails. Use four nails on each end; two per side.
8. Check the squareness of the ceiling joists.
9. Mark, cut, and install the backing for nailing ceiling surface material. (See figure 8-37, page 132, in Modern Carpentry.)
10. Upon completion of your work evaluate your job in terms of the Objective.
11. When satisfied with your joists' installation, contact the instructor for his evaluation.
12. Upon satisfactory completion of this job you will be directed to the next task package.

The house is certainly taking shape and you may feel justly proud for your contributions to its appearance.

C-X-9

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 9: PURLINS

PREREQUISITES: UNITS I-VII; UNIT IX; UNIT X, TASK PACKAGES 1-8

RATIONALE:

Do you know how to stop a fire in the wall? Put purlins in. There's nothing like a purlin to give curlin' flames a bad time.

Perhaps the next task that the carpenter will perform is the installation of purlins or fire stops into the wall. These consist of 2" x 4" boards installed between the studs and serve to keep a fire from spreading as fast as it otherwise might do. Without purlins the space between the studs would act like a vent, allowing the fire and fumes to travel straight up the walls between the studs. In this task package you will learn how to cut and install purlins in the walls. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to install purlins in the wall structure of a residential building according to plans and specifications maintaining the following standards:

a. purlins are correctly cut as to length (± 1/16").

b. purlins are installed with their alternating bottoms and tops at the 48" level above the sub-floor.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-9.
2. Read pages 87 and 88 in Fundamentals of Carpentry, Volume II, the section entitled "Fire Hazards".
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 10d nails
3. Folding-wood rule
4. Pencil
5. 2 x 4 stock
6. Crosscut saw
7. Portable electric circular saw

1. Measure up from the sub-floor 48" and place a mark on all the studs at this level.

LEARNING PRACTICE (cont'd):

2. Lay out and cut the 2" x 4" stock the length to be installed between the studs at the 48" level.
3. Install the purlins (the cut 2 x 4's) with their alternating bottoms and tops at the 48" level above the sub-floor.
4. Nail each end of all purlins to the studs with two number 10d nails.
5. Check your work and, when ready, seek the evaluation of the instructor.
6. When you have satisfactorily completed the job you will be directed to the next task package.

This task package on purlins sure didn't put out your fire for this type of work. Blaze ahead to the next assignment. You're like a ball of fire in your study of purlins.

UNIT X: WALL FRAMING FOR A HOUSE

TASK PACKAGE 10: HEADERS FOR INSIDE DOORS AND CASE OPENINGS

PREREQUISITES: UNITS I-VII; UNIT IX; UNIT X, TASK PACKAGES 1-9

RATIONALE:

Take a deep breath and head into this package on headers. If you head in the right direction, you'll get all these new skills into your head.

To determine what headers are needed for inside doors and case openings, the carpenter must consult the house plans and observe the inside wall structure. If the inside walls (called partitions) are non-load bearing, they do not require headers. Therefore, many openings can be framed with the single pieces of 2" x 4" lumber. If the inside doors and/or case openings occur in bearing partitions, there will be need to construct headers to provide for the extra support needed over these openings due to the extra load imposed by the rafters and roof. In this task package you will learn how to construct headers for inside doors and case openings where necessary. Continue by reading the Objective and performing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to construct headers for inside doors and case openings in the wall structure of a residential building according to plans and specifications maintaining the following standards:

a. headers are of the correct length (± 1/16").

b. double header with spacers is correctly constructed if needed for a load-bearing wall.

c. headers are properly positioned and nailed.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-X-10, a headline attraction.
2. Read and study pages 142-147 in Modern Carpentry, the section entitled Partitions. Refer also to table entitled Header Spans on page 137. Discuss this basic question with a fellow student: What is the difference between the construction of headers for inside doors and case openings and window and outside door headers?
3. This completes your Learning Activity; begin your Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 10d and 16d nails
3. Crosscut saw
4. Portable electric circular saw
5. Combination square
6. Framing square
7. Pencil
8. 2" x 8" or 2" x 10" stock
9. 3/8" plywood spacing material

1. Refer to the house plans and check the inside walls to determine which partitions are load bearing.
2. Determine the size of the doors or case openings needing headers. Refer to page 137 in Modern Carpentry and study the table entitled Header Spans in order to help in the determination of the size of lumber to be used in the headers.
3. Select one particular door or case opening needing a header. Mark and cut two 2" x 8" or two 2" x 10" boards (size dependent upon the plans and the table referred to above) to the proper length.
4. Cut three 3/8" plywood spacers to be placed between the two 2" pieces of stock.
5. Nail the header together, using 10d nails and following same procedure employed in task package 4 of this unit.
6. Install this header into place between the studs and at the level indicated on the plans. Nail in place with 16d nails

LEARNING PRACTICE (cont'd):

through the studs into both ends of the header.

7. All inside doors and case openings needing headers will be constructed the same as outlined above.
8. Compare your work with the Objective and, when satisfied, report to the instructor.
9. Upon completion of this job in a satisfactory manner you will be directed to begin on the next unit. You're head-on shoulders above many students.

You're undoubtedly headed for an interesting career in carpentry.

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: CARPENTRY
COURSE: CARPENTRY

CE003938 (K)

UNIT PACKAGE XI: ROOF FRAMING FOR A HOUSE

PREREQUISITES: UNITS I-VII; UNITS IX-X

RATIONALE:

Since the wall framing has been completed in unit X, the next step, as many carpenters believe is to install the roof framing. This is done primarily in order to protect the other structural members from the weather. By sheltering the interior of the house, this allows other work to progress on the inside. The components comprising the roof framing are the rafters, ridge boards, bracing, trusses, gables, louvers, sheathing, insulation paper, and shingles. Since you have already demonstrated many competences and skills in this class thus far there is no reason to doubt that you will meet with equal success in this unit. Proceed, then, by reading the General Objective for the unit and the Specific Objectives for each task package with in the unit. Continue, on, with the reading of the Learning Activity, which you will note, contains what you are to do and how you are to go about performing the tasks.

OBJECTIVES:

General:

Upon completion of this unit you will be able to lay out, cut, and install roof framing for a house.

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Lay out, cut and install common rafters for a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:
   a. length of common rafters is computed correctly with respect to span of building, pitch of roof, and overhang, within (± 1/16").
   b. bird's mouth is correctly cut on common rafters.
   c. ridge cut of common rafter is correctly cut to within (± 1/16") of the required angle with respect to appropriate angle (± 2°).
   d. tail cut of common rafters correctly cut with respect to appropriate angle (± 2°).
   e. common rafters are properly positioned (± 1/16") and nailed to plate and ridge (type of fastener and spacing).
   f. overhang is of proper length (± 1/16").

Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVES (cont'd):

2. Mark off and install ridge board for a residential structure according to plans and specifications supplied by the instructor maintaining the following standards:
   a. ridge board is laid out the same as the top plate (16" on centers for rafter, ± 1/16").
   b. ridge board is properly installed (type of fastener and spacing) and is horizontal (± 1/16").

   Your performance will be evaluated in accordance with the instructor's checklist.

3. Cut and install roof bracing in a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:
   a. purlin is correctly positioned as specified in the plans (± 1/8").
   b. purlin plate positioned over a load-bearing partition.
   c. purlin stud and plate correctly cut as to lengths (± 1/16") and angles (± 1°).
   d. purlin stud and plate correctly positioned and nailed.
   e. collar tie correctly cut with respect to length (± 1/16") and angle (± 1°).
   f. collar tie correctly positioned and secured.

   Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVES (Cont'd):

4. Cut, build, and install a roof truss for a residential structure according to plans and specifications supplied by the instructor; the truss is to be completed in accordance with Modern Carpentry, page 177 through page 180.

   Your performance will be evaluated in accordance with the instructor's checklist.

5. Cut and install framing in a gable for a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

   a. gable studs are correctly cut with respect to length (± 1/16") and angle of (± 1°).

   b. gable studs properly placed (± 1/8") and secured.

   Your performance will be evaluated in accordance with the instructor's checklist.

6. Build and install louvers for a residential structure according to plans and specifications supplied by the instructor. The procedure outlined in Unit 9 of Modern Carpentry will serve as a guide.

   Your performance will be evaluated in accordance with the instructor's checklist.

7. Cut and install either solid or spaced roof sheathing for a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

OBJECTIVES (cont'd):

- a. solid sheathing
    1. joints are staggered and centered on rafters.
    2. sheathing is properly nailed with respect to type of fastener and spacing.
    3. joints are tight (no space exceeds 1/8" width).
    4. sheathing is square with rafters (± 1/16").
- b. spaced sheathing
    1. sheathing joints are staggered and centered on rafters.
    2. sheathing is properly nailed with appropriate type of fasteners that are correctly spaced.
    3. sheathing is square with rafters (± 1/32").

Your performance will be evaluated in accordance with the instructor's checklist.

8. Cut and install felt paper on a residential structure according to plans and specifications supplied by the instructor and using Modern Carpentry, Chapter 10, page 186 through page 189 as your criteria. Your performance will be evaluated in accordance with the instructor's checklist.

9. Mark off and install composition shingles on a residential structure according to plans and specifications supplied by the instructor maintaining the following standards:
    - a. calculation of the number of shingles is correct to within ± 6 shingles.

OBJECTIVES (cont'd):

b. first course of shingles is applied over starter strip and is correctly positioned with respect to eaves and rake (± 1/16").

c. each succeeding course is properly laid to break joints with the course below (± 1/16").

d. shingles are properly laid with respect to tab exposure.

e. shingles are properly nailed (nail size, spacing, and penetration).

f. rows of shingles are straight (± 1/4" at midpoint).

g. roof is swept free of debris.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on Roof Framing For A House consists of nine task packages which should be completed in order. Note the units that should be completed prior to beginning work on this one. As you perform the required work on each task package you will view a sound-slide package, do readings, answer questions, and complete other activities as directed. The titles of the individual task packages within this unit are:

TASK PACKAGE 1: COMMON RAFTERS

TASK PACKAGE 2: RIDGE BOARD

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 3: ROOF BRACING

TASK PACKAGE 4: ROOF TRUSS

TASK PACKAGE 5: FRAMING IN GABLE

TASK PACKAGE 6: LOUVER

TASK PACKAGE 7: ROOF SHEATHING

TASK PACKAGE 8: FELT PAPER

TASK PACKAGE 9: SHINGLES

If after reading the unit package, you feel that you can pass a comprehensive examination over the material covered in this unit, you should contact the instructor for the administration of this test. However, if you feel that you are not ready to be examined at this time, proceed to work on the task packages as previously described.

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK PACKAGE 1: COMMON RAFTERS

PREREQUISITES: UNITS I-VII; UNITS IX-X

RATIONALE:

Many so-called common things are really good things. Take the common rafter, for instance. It supports the roofing material which protects the unfinished structure and keeps raindrops from falling on your head while you work inside.

Now that the wall framing for your house has been completed in Unit X, the next step, as many carpenters believe, is to apply a covering over the walls in order to protect the structural members from the weather. This procedure also allows other work to progress inside the house. The first stage in providing this cover is to lay out and cut common rafters which become the foundation upon which the rest of the roofing material will be placed. Logically, then, in this task package you will learn how to lay out, cut, and install common rafters for your house, using the plans and specifications provided. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to lay out, cut and install common rafters for a residential structure according to plans and specifications maintaining the following standards:

a. length of common rafters is computed correctly with respect to span of building, pitch of roof, and overhang, within (± 1/16").

b. bird's mouth is correctly cut on common rafters.

c. ridge cut of common rafters is correctly cut to within (± 1/16") of the required angle with respect to appropriate angle (± 2°).

d. tail cut of common rafters correctly cut with respect to appropriate angle (± 2°).

e. common rafters are properly positioned (± 1/16") and nailed to plate and ridge (type of fastener and spacing).

f. overhang is of proper length (± 1/16").

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XI-1, an extra special feature.
2. Read and study carefully pages 157-165 in Modern Carpentry, ending your reading with the section entitled Gable End Frame on page 165.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. 100 foot layout tape
2. Folding wood rule
3. Crosscut saw
4. Portable electric circular saw
5. Radial arm saw
6. Framing square
7. Pencil
8. Combination square

1. Contact your instructor and discuss the laying out, the cutting, and the installation of common rafters. When you and your instructor feel you are ready to proceed, go to step 2 in the Learning Practice.
2. Refer to the plans for the house and determine the number of common rafters needed, the spacing between them, their length, their width, and their thickness. Note - To determine length of the rafters you will need to know the slope of the roof and the amount of overhang required.
3. Referring to the procedure outlined in Modern Carpentry, pages 161 to 163, and using the framing square, lay out a common rafter

LEARNING PRACTICE (cont'd):

on a straight and true piece of stock of the correct length, using the proper width and thickness of lumber. You should lay out for the ridge cut, bird's-mouth (seat cut and plumb-cut), the tail cut, and provide for the proper overhang.

4. If difficulty is encountered in the layout, contact the instructor for help. When satisfied that the rafter has been properly laid out, let the instructor check your final layout.
5. Cut the rafter along the lines you have laid out and label this rafter as a pattern.
6. All other common rafters may now be laid out using the pattern rafter as a model.
7. So that the rafters may be properly positioned when erected into place, lay out the double plate according to the plans and specifications.
8. After you have evaluated yourself on the work, contact the instructor.
9. After satisfactory completion of this job you will be directed to the next task package.
10. Place all of the common rafters aside until you begin work on the next task package.

No attempt at humor will be made here-just a hearty congratulations for a job well done!

There's nothing common about the way you study carpentry!

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK PACKAGE 2: RIDGE BOARD

PREREQUISITES: UNITS I-VII; UNITS IX-X; UNIT XI, TASK PACKAGE 1

RATIONALE:

Have you ever been fit to be tied? Well, rafters get that way all the time. And you have to bring in the old ridge board to take care of that situation.

In order to position the rafters in place and to "tie" them together in an integrated unit, the carpenter will next cut and place the ridge board between the rafters at the top or ridge of the house. The ridge board provides a means by which the rafters can be attached at the upper end while it also furnishes the needed rigidity for the rafters at this stage of construction. In this assignment you will learn how to mark off and install the ridge board for your house following the plans and specifications. Continue with this package now by reading the Objective and performing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to mark off and install ridge board for a residential structure according to plans and specifications supplied by the instructor maintaining the following standards:

a. ridge board is laid out the same as the double plate (16" on centers for rafter ± 1/16).

b. ridge board is properly installed (type of fastener and spacing) and is horizontal (± 1/16").

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ________________________________, a four-star production.
2. Read and study pages 163-165 in Modern Carpentry, the section entitled Erecting a Gable Roof. How long will the ridge board be in the house that you are building considering the type of roof you will use?
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. 100-foot layout tape
2. Folding wood rule
3. Crosscut saw
4. Combination square
5. Framing square
6. Pencil
7. Hammer
8. 16d nails
9. Stock for ridge board
10. Rafters previously cut
11. Temporary bracing material
12. Hatchet

1. Select straight pieces of ridge stock (2 x 3's in this case) and lay out the rafter spacing by transferring the markings directly from the double plate to the ridge boards. Note - the spacing for the ceiling joists is usually-16" on center; for rafters 16" or 24" on center, and for the ridge board the spacing is the same as for the rafters.

2. Cut the pieces that will make up the ridge, insuring that the joints in the ridge occur at the center line of a rafter. Place these cut pieces of ridge stock upon the ceiling joists close to where they will be assembled with the rafters.

3. Place the previously cut rafters (task package 1 of this unit) against the house as shown in figure 9-18, page 165, in Modern Carpentry so they will be readily available for use.

4. Select straight rafters for the gable end, place the crown up, and nail one in place at the plate as shown in figure 9-14, page 164, in Modern Carpentry. Next, install a rafter with the

LEARNING PRACTICE (cont'd):

crown up; on the opposite side with a helper at the ridge supporting both rafters.

5. Place the ridge between the two rafters with the top edge of the rafter flush with the top edge of the ridge board. Nail these members temporarily in place. Move about five rafter spaces away and install another pair of rafters lined up on the proper markings. Plumb and brace the assembly, making any adjustments necessary and then nail the end rafters permanently in place.
6. Continue installing the rafters, nailing first to the plate and then to the ridge (see figure 9-17, page 165, in Modern Carpentry).
7. When a rafter is placed against a ceiling joist it should be nailed to the joist as shown in figure 9-15, page 164, in Modern Carpentry. If a rafter falls between the joists, it is nailed to the double plate as shown in the same figure.
8. Following the above procedure, continue until all rafters have been installed to the ridge boards, joists, and double plates. Note - Make sure that the ridge is kept straight and level.
9. If the ends of the joists have not already been cut to conform to the angles of the rafters, they should be cut at this time, using a hatchet or a crosscut saw.
10. When you are assured that your installation is correct, contact the instructor for his evaluation.
11. Upon satisfactory completion of this job you will be directed to the next task package. Remember -- Keep smiling!

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK PACKAGE 3: ROOF BRACING

PREREQUISITES: UNITS I-VII; UNITS IX-X; UNIT XI, TASK PACKAGES 1 AND 2

RATIONALE:

Don't raise the roof here. Just brace the roof. Yes, that's the spirit - brace yourself, too, and continue acquiring new carpentry skills.

If the span of the rafters exceeds the maximum allowed, additional support must be provided. This support is often accomplished by the use of purlins. Purlins are usually 2 x 4's attached to the under side of the rafters and are supported by bracing which is placed on supporting partitions. Another type of bracing used is known as collar beams, which are used to "tie" rafters together that are on opposite sides of the roof. These beams help hold the ridge and the rafters together. In this task package you will learn how to cut and install roof bracing (purlins and collar beams) according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install roof bracing in a residential structure according to plans and specifications supplied by the instructor maintaining the following standards:

a. purlin is correctly positioned as specified in the plans (± 1/8").

b. purlin plate positioned over a load-bearing partition.

c. purlin stud and plate correctly cut as to lengths (± 1/16") and angles (± 1°).

d. purlin stud and plate correctly positioned and nailed.

e. collar beam correctly cut with respect to length (± 1/16") and angle (± 1°).

f. collar beam correctly positioned and secure.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XI-3, which is a bracing show.
2. Read pages 174-175, sections entitled Collar Beams and Purlins, in *Modern Carpentry*.
3. Read pages 197-198 in *Fundamentals of Carpentry*, Volume II, the section entitled Collar Beams and Ceiling Joists.

LEARNING ACTIVITY (cont'd):

4. This completes the Learning Activity; start on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d and 16d nails
3. Combination square
4. Framing square
5. 2 x 4 stock for purlins
6. 1 x 6 stock for collar beams
7. Crosscut saw
8. Folding wood rule
9. Carpenters level
10. Pencil

1. Refer to the plans for the location and number of purlins and collar beams to be cut and installed.
2. In cutting and installing the purlins, use the following procedure:
   a. Place a double-nailed 2 x 4 flat on one face and at right angles across the ceiling joists. The center of the doubled 2 x 4 should be directly above a supporting partition, and the length of the 2 x 4 would be cut flush with the two outside ceiling joists.
   b. Toe-nail this doubled 2 x 4 into place on the ceiling joists, using 16d nails.
   c. Place a 2 x 4 in a vertical position upon and in the center of, the double 2 x 4, and against a rafter. Mark and cut the

LEARNING PRACTICE (cont'd):

angle that the rafter makes against the plumb 2 x 4. Note–the angle mark will be on the face of the 2 x 4.

d. Toe nail the base of the vertical 2 x 4 to the doubled 2 x 4 and nail the upper end to the rafter, using 16d nails.

e. Follow the same procedure in cutting and installing other such braces.

3. In cutting and installing collar beams, follow this procedure:

a. Select [illegible] from 1" x 6" stock for the collar beams.

b. Place a piece of 1" x 6" stock against two rafters and in a horizontal position. See Figure 9-41, page 174, in Modern Carpentry.

c. Mark the ends of the collar beam on the same angle as the rafters. (Refer to Figure 9-41 again.) Saw the beam to those lines.

d. Nail the collar beam into place against the rafters, using 8d nails.

e. Collar beams are usually installed at every third pair of rafters and will follow the same installation procedure as given.

4. When your job has been completed and you have evaluated it against the objective, report to the instructor for his evaluation.

5. Upon the instructor's satisfactory evaluation of your finished work, you will be requested to start on the next task package.

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK PACKAGE 4: ROOF TRUSS

PREREQUISITES: UNITS I-VII; UNIT IX-X; UNIT XI, TASK PACKAGES 1-3

RATIONALE:

Often in contemporary houses the design calls for large open areas of living space unhampered by load-bearing partitions. In such cases roof trusses are constructed and used to carry the roof and ceiling surfaces because the truss does not need a load-bearing partition on which to rest. Trusses of this type span the entire width of the structure and rest on the exterior walls. In addition to permitting the use of larger rooms without extra beams and supports, the truss may even reduce labor cost. In this task package you will learn how to cut, build, and install a roof truss according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut, build, and install a roof truss for a residential structure according to plans and specifications supplied by the instructor; the truss is to be completed in accordance with Modern Carpentry, page 177 through page 180. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ________, a stupendous show.
2. Read and study carefully pages 177-180 in Modern Carpentry, the section entitled Roof Truss Construction. Discuss roof truss construction with a fellow student. Explain to him how you would proceed in constructing a roof truss.
3. This completes the Learning Activity; begin now on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d and 10d nails
3. Chalk line
4. Framing square
5. Combination square
6. Crosscut saw
7. Portable electric saw
8. Plywood for gussets

LEARNING PRACTICE (cont'd):

9. 2" x 4" stock
10. 2" x 6" stock
11. Pencil

1. Discuss truss construction with your instructor. Seek clarification on any points you do not understand.
2. Using the house plans, determine the number, size and location of all trusses to be installed.
3. Clear a floor area and make a full-size layout on the floor according to the procedure covered on page 179 in Modern Carpentry.
4. Align the lumber with the layout, to mark the size, and then cut the pieces accurately. (See page 179 in Modern Carpentry for this procedure.)
5. In assembling a truss, tack all joints together and then glue and nail the truss plates in place. (See page 179 in Modern Carpentry.) Turn the truss over and complete the opposite side.
6. If more than one truss of the same size is to be constructed, use the pieces of the first truss as the patterns, and follow the procedure outlined on page 179 in Modern Carpentry.
7. Upon completion of your work, seek the evaluation of your instructor.
8. When your finished job is deemed satisfactory by your instructor you will be directed to the next task package.

LEARNING PRACTICE (cont'd):

If you didn't get all trussed-up, take a bow! You've really earned it.

Carpentry is a wide open career area. Explore it well.

C-XI-5

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK 5: FRAMING IN GABLE

PREREQUISITES: UNITS I-VIII; UNITS IX-X; UNIT XI, TASK PACKAGES 1-4

RATIONALE:

Have you read The House of Seven Gables? It's a classic American novel by Hawthorne. Well, if a house has seven gables, it should have seven framings in gables, right? You'll study framing in the gable in this package.

After the rafters, trusses (if any), the ridge boards and the bracing for the roof have been installed in place on top of the house, many carpenters believe the next step in construction is to build the framing in the gable. Framing in the gable consists primarily in cutting and installing short 2 x 4 studs that are placed between the double plate of the end wall and the underside of the end rafters. Often, provision is made in this framing for some type of opening into which can be placed a vent or louver. Equally as often, part of the roof framing is extended out over the end of the house in order to afford protection from the weather. In this task package you will be expected to cut and install framing in a gable according to plans and specifications provided you. Ready to start? If ready, begin your work, get set, and gable by reading the Objective and doing the Learning Activity and the Learning Practice.

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C-XI-5

OBJECTIVE:

Upon completion of this task package you will be able to cut and install framing in a gable for a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

a. gable studs are correctly cut with respect to length (± 1/16") and angle of (± 1°).

b. gable studs properly placed (± 1/8") and secured.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XI-5, which may star Clark Gable.
2. Read pages 165-166, the section entitled Gable End Frame, in Modern Carpentry.
3. Read pages 198-199 in Fundamentals of Carpentry, Volume II, the section entitled Gable End Framing.
4. Study figures 156-4, Gable Roof Framing, and 156-7, Framing a Gable and Overhang, on pages 387-388 in Technical Woodworking.
5. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 16d nails
3. Crosscut saw
4. Portable electric circular saw
5. Combination square
6. Framing square
7. Carpenter's level
8. Folding wood rule
9. Pencil
10. 2 x 4 stock
11. 2 x 6 stock if needed

1. Study the plans of the house to determine where the framing will be located in the gable and the size of stock needed.
2. Square a line across the end wall double plate directly below the center of the gable. To provide a space for the louver, measure one-half of the opening size on each side of the center line, and mark for the first two studs. (See figure 9-20, page 166, in Modern Carpentry.)
3. Lay out the balance of the stud spacing, using 16" on centers if not otherwise indicated on the plans.
4. On 2" x 4" stock lay out each set of two studs for the correct length, the notched cut, and proper angle until all studs have been laid out. (See figure 156-4, page 387, in Technical Woodworking for this procedure.)

LEARNING PRACTICE (cont"d):

5. Plumb all studs and nail in place, toe nailing the bottom of each stud and nailing through the notch into the rafter at the top. (See figure 15-4 [illegible].) The studs should be positioned so that the outside edge is flush with the outside of the double plates and also the outside of the rafters.

6. The above procedure may be used in framing in any other gables on the house.

7. If the plans specify an extended roof rake at the gable end, two additional rafters, at each gable, need to be cut and attached to the overhanging ridge board. (See figure 9 - 22, page 167, in Modern Carpentry.)

8. Additional structural members must be cut and attached as shown in figure 9 - 22, page 167, and explained on page 166 in Modern Carpentry, in order to support the overhanging rafters.

9. The procedure covered in 7 and 8 above will be used in extending the roof at any other gable end of the house.

10. When satisfied that your work has been completed properly, seek the evaluation of your instructor.

11. Upon satisfactory completion of the job, you will be directed to the next exercise. How many of your friends could have done what you did on this job? You know, of course, that carpenters are always in demand.

A gable is way up there near the top, where a good carpenter can rise.

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK PACKAGE 6: LOUVER

PREREQUISITES: UNITS I-VII; UNITS IX-X; UNIT XI, TASK PACKAGES 1-5

RATIONALE:

Have you ever heard of the Louvre? It's a famous art gallery in Paris. However, this package is about a different type of art - the art of carpentry. And at this point you become acquainted with the louver.

With today's building practices and advanced insulation materials being used, houses are much tighter and more draft-free than those of half a century ago. This lack of circulating air can cause problems, however, such as moisture condensation in cold weather and heat in hot weather being built up in the attic space of a house. These problems can be reduced or possibly eliminated by providing ventilation of the attic space. This is partially accomplished by the use of various shapes of vents (louvers) placed in the gable and wall near the rafters. These louvers provide for free circulation of air when placed in each gable wall and used in conjunction with other types of vents. In this task package you learn how to build and install louvers in a house according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to build and install louvers for a residential structure according to plans and specifications supplied by the instructor. The section entitled Ventilation on pages 287 - 290 of Modern Carpentry will serve as a guide. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ______________________, a four-star smash.
2. Read pages 165-166 in Modern Carpentry, the section entitled Gable End Frame. Study figure 9-20, page 166, noting particularly the vent opening. Refer, also, to page 465 of the appendices and study the ventilator information. Study carefully pages 287-290, the section entitled Ventilation.
3. Read pages 398-399 in Technical Woodworking, the section entitled Ventilation of Attic Space.
4. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d nails
3. Folding wood rule
4. Combination square
5. Pencil
6. Cross-cut saw
7. Wooden stock for louver
8. Portable electric circular saw
9. Radial arm saw

1. Discuss louvers with your instructor; study the plans and determine what type and size of louver is to be installed.
2. In task package 5 of this unit you framed in the gable end of the house and hopefully provided for the vent opening. (See page 166, figure 9-20, in Modern Carpentry.) Also refer to page 288, figure 13-28.
3. If a vent opening was not provided it may be done simply by framing exactly the same as in other exterior walls.
4. Construct a triangle or rectangular wooden frame, dependent upon your plans, in which to insert the louver strips. NOTE - The louver strips are inserted at an angle in slots cut on the side strips of the frame. (See pages 288-289 in Modern Carpentry for construction details of a triangular-shaped frame.)
5. If any difficulty is encountered in the frame construction, seek help from the instructor.

LEARNING PRACTICE (cont'd):

6. Nail the frame together with the louvers inserted in place. On the rear side of the frame, nail wire cloth in place to keep birds and small animals out of the attic.
7. Install the frame in place, nailing where applicable, dependent upon the shape of the louvered frame.
8. When finished with the job, have the instructor evaluate your work.
9. Upon satisfactory completion of the louver, you will be directed to the next task package. Hang in there, Charlie, you shall overcome.

You're on your way to becoming an artist in carpentry.

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK PACKAGE 7: ROOF SHEATHING

PREREQUISITES: UNITS I-VII; UNITS IX-X; UNIT XI, TASK PACKAGES 1-6

RATIONALE:

Be careful not to rouse up any bats on this project. You'll be up there among the rafters, where the bats hang out. Just don't mistake a bat for sheathing material.

Back to the roof again! The next step is to install the roof sheathing on top of the rafters. Two of the most common sheathing materials are sheet plywood and 1" x 6" tongue and grooved boards. No matter what type of sheathing is used, the procedure for fastening it to the rafters is essentially the same. The boards are nailed to the rafters, with the length of the boards running at right angles to the rafters. When a joint is necessary, it is made to fall on the center of the thickness of a rafter. Sheathing is very easy to apply and this work progresses rather fast. Ready to start? On your mark, get set, go next to the Objective, which you should read carefully, and then do the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install either solid or spaced roof sheathing for a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

a. solid sheathing

1. joints are staggered and centered on rafters.
2. sheathing is properly nailed with respect to type of fastener and spacing.
3. joints are tight (no space exceeds 1/8" width).
4. sheathing is square with rafters (± 1/16").

b. spaced sheathing

1. sheathing joints are staggered and centered on rafters.
2. sheathing is properly nailed with appropriate type of fasteners that are correctly spaced.
3. sheathing is square with rafters (± 1/32").

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package _________ starring Mr. Sheathing.
2. Read pages 180-182 in Modern Carpentry, the section entitled Roof Sheathing. Study the illustrations in this section.
3. This concludes the Learning Activity; hurry on to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d coated nails
3. Crosscut saw
4. Portable electric circular saw
5. Folding wood rule
6. Pencil
7. Combination square
8. Supply of 1" x 6" long sheathing stock
9. Supply of 4" x 8" sheet plywood (if used for sheathing)

1. Study the roofing area to be sheathed and make sure necessary scaffolds are in place so that it will be easy and safe to install the boards or panels along the lower edge of the roof. See figure 9-57, page 181, in Modern Carpentry.
2. The following process should be used if solid plywood sheathing is to be installed. (Modern Carpentry, pages 181-182, will serve as your reference.)

LEARNING PRACTICE (cont'd):

   a. Determine thickness of plywood to be used by referring to page 182 of the reference cited above.

   b. The plywood is laid with the face grain perpendicular to the rafters, with the end joints formed directly over the center of a rafter.

   c. Small pieces of the plywood may be used but they should always cover two rafter spaces.

   d. Nail the sheathing to the rafters with 8d coated nails spaced 6 inches apart on edges and 12 inches elsewhere.

   e. Make sure that the joints formed when pieces of sheathing fit together are centered on the rafters, are tight against one another, and are square with the rafters.

3. For spaced sheathing (1" x 6" boards), use the following installation procedure. (Pages 181-182 in Modern Carpentry will serve as your reference.)

   a. Long boards should be used when possible, with no boards used that are not long enough to be carried on at least two rafters.

   b. Begin installation at the lower end of the rafters, so that the board runs at right angles to the rafters and the joints are centered on the rafters.

LEARNING PRACTICE (cont'd):

c. Drive two 8d nails through the board and into each rafter it rests upon.

d. Boards should be placed to fit flush against one another with the end joints being staggered; that is, the joints of adjacent boards do not fall on the same rafter.

e. To obtain maximum rigidity, use long boards, particularly at roof ends.

4. After you have evaluated your finished job in terms of the Objective, request the instructor's evaluation.

5. If you have satisfactorily completed the roof sheathing, you will be directed to the next task package. Man, the house is looking great and you are progressing along at a rapid pace! Let's get the house protected against the weather; see what's in store for you in the next package.

Keep your chin up - and you can see farther ahead.

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK PACKAGE 8: FELT PAPER

PREREQUISITES: UNITS I-VII; UNITS IX-X; UNIT XI, TASK PACKAGES 1 - 7

RATIONALE:

Have you ever felt paper? It has a sort of pulpy feel, doesn't it? Well, the felt paper in this package has a sort of felt feel. It's time to learn about it.

Here we are back on the roof again! This time we need to cover the sheathing with a water repellent felt material to protect the roof until we can install the shingles. So, when the roof deck is dry, cover it with an asphalt-saturated felt or other material that has a low vapor resistance. This underlayment material usually comes in rolls and protects the sheathing from moisture until the shingles are laid, as has already been stated, but it also provides additional weather protection. The felt affords protection by preventing the entrance of wind-driven rain and snow and prevents direct contact between the shingles and resinous areas in the sheathing. In this task package you will learn how to install felting material according to plans and specifications. Ready to roll on the felt? OK, but first roll on to the Objective, do the Learning Activity, and then roll through the Learning Practice, where you will get to roll on the felt.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install felting material on a residential structure according to plans and specifications supplied by the instructor and using Modern Carpentry, Chapter 10, page 186 through page 189, as your standards. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XI-8, a rolling show.
2. Read and study carefully pages 185-189 in Modern Carpentry. End with section entitled Drip Edge.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Roofing nails
3. Roll asphalt roofing felt
4. Folding wood rule
5. Pencil
6. Knife for cutting felt

1. Determine what type of roll felting material to employ. Probably the most common material in use is the 15 lb. roll saturated felt.
2. Inspect the sheathing to see that nailing patterns are complete and there are no protruding nails. Joints should be smooth and

LEARNING PRACTICE (cont'd):

free of sharp edges that might cut through the roofing materials. If large knot holes, 1" diameter, are in the sheathing, cover them with a piece of sheet metal. Clean the sheathing of any chips or other scrap material.

3. If the roof is to be equipped with a metal drip edge it should be installed at this time. (Check with your instructor about this.) Page 189, figure 10-5, in Modern Carpentry shows the installation of the metal drip edge on the eaves and along the rake.
4. Apply the roll felting material, beginning at one end of the house at the eave level, and unroll a piece long enough to reach the entire length of the house. Nail the felt in place, using roofing nails and pattern described in Modern Carpentry, page 189.
5. General application standards for felting material suggest a 2" top lap at all horizontal joints and a 4" side lap at all end joints. See figure 10-5, page 189, in Modern Carpentry.
6. Continue laying the felting according to the procedure outlined on page 189 in Modern Carpentry until one side of the roof has been completed. NOTE - Each successive layer overlaps the one below it.
7. Install the felting material to the remainder of the roof in a manner similar to that already covered.

LEARNING PRACTICE (cont'd):

8. When you are satisfied with your completed work, contact the instructor for his evaluation.
9. Upon satisfactory completion of this job you will be directed to the next task package.

You sure rolled on this job, so roll on to the next assignment. It's a big put-down, but it certainly won't put you down. You're really rolling on to a career in carpentry.

UNIT XI: ROOF FRAMING FOR A HOUSE

TASK PACKAGE 9: SHINGLES

PREREQUISITES: UNITS I-VII; UNITS IX-X; UNIT XI, TASK PACKAGES 1-8

RATIONALE:

You know you spend about as much time around the roof as Santa Claus's reindeer! Good for you. That's just the way to learn about this roofing process.

The final phase in completing the roof is to install the shingles into place. They are positioned one at a time in a predetermined pattern and then nailed in place. This is the big put-down referred to in package 8. Seriously, however, for the protection and the beauty of the finished house, shingles must be applied very systematically and very accurately. If this procedure is followed, the shingle roof will keep its beauty and last for many years before needing to be replaced. In this task package you will learn how to mark off and install the composition shingles according to plans and specifications. Continue, now, by reading the Objective and then doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to mark off and install composition shingles on a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

a. calculation of the number of shingles is correct to within (± 6 shingles).

b. first course of shingles is applied over starter strip and is correctly positioned with respect to eaves and rake (± 1/16").

c. each succeeding course is properly laid to break joints with the course below (± 1/16").

d. shingles are properly laid with respect to tab exposure.

e. shingles are properly nailed (nail size, spacing, and penetration).

f. rows of shingles are straight (± 1/4" at midpoint).

g. roof is swept free of debris.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ___________, a jolly good show.

2. Read and study carefully pages 189-195 in Modern Carpentry,

LEARNING ACTIVITY (cont'd):

beginning with Flashing at Eaves and ending your reading with the section entitled Individual Asphalt Shingles. Note particularly the sections on Strip Shingles, Nailing and Fastening, Starter Strip, First and Succeeding Courses, Hips and Ridges, and Wind Protection.

3. This completes your Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Roofing nails
3. Asphalt roofing shingles
4. Snips or knife
5. Combination square
6. Folding wood rule
7. Chalk line and chalk

1. Consult with your instructor and view the plans to determine what type of shingles to use, the application pattern desired, and the number of shingles needed. Most likely the 3 Tab Square Butt Strip Shingle will be selected. (See page 188, Figure 10-4, in Modern Carpentry.)
2. When the roof surface is over 30 feet in length, it is usually best to start at the center and work both ways from a line perpendicular to the eaves and ridge.
3. Since asphalt shingles vary slightly in length and width, chalk lines should be used, in order to control the proper placement of

LEARNING PRACTICE (cont'd):

shingles so they will be accurately aligned horizontally and vertically.

4. When making installation of asphalt shingles from the center of the roof toward the ends, snap a number of chalk lines between eaves and ridge to serve as reference marks for starting each course. See pages 191-192 in Modern Carpentry for the procedure to use according to type of shingle and the laying pattern.
5. Apply the starter strip so that it overhangs the drip edge slightly, and secure it with nails spaced 3 to 4 inches above the edge. See page 192 in Modern Carpentry for detailed procedure.
6. Since shingles must be carried to the roof, a bundle of them becomes quite heavy. The package may be opened and a few shingles at a time may be carried. Keep in mind that you should only lift loads you can safely handle; see figure 1.
7. The next step is to apply the first course of shingles and nail in place. Follow the procedure outlined on pages 192 and 193 in Modern Carpentry.
8. Follow the procedure outlined on pages 192-193 in Modern Carpentry for installing succeeding courses of shingles, nailing them in place as indicated.

LEARNING PRACTICE (cont'd):

9. After completing one side of the roof using the preceding steps, begin applying shingles to the other side.

   Note - To shingle any roof, follow the same general procedure.

10. Finish your roof by installing shingles to the ridge, following the steps outlined on pages 194-195 in Modern Carpentry.
11. Sweep the roof free of debris and then compare your finished job with the Objective.
12. When satisfied, contact your instructor for his evaluation.
13. If you have satisfactorily completed the installation of the shingles, you will be directed to the next unit.

Weaker students would have been put down by this assignment, but not you. Congratulations!

LIFT ONLY LOADS
SCHS
YOU CAN
SAFELY HANDLE

Figure 1

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

THE POWER TO CHANGE TOMORROW

CLUSTER: CARPENTRY
COURSE: CARPENTRY

CE003989(7)

UNIT-PACKAGE XII: EXTERIOR WALL FINISH

PREREQUISITES: UNITS I-VII; UNITS IX-XI

RATIONALE:

Now that you have installed the roof covering upon your house so that the inside would be protected from the elements, you now need to begin work on the outside of the house. The first step is to attach insulation board or wall sheathing. Additional components to be installed are the siding, fascia board, boxing in the eaves and rake, and molding in the eave and sidewall. Next you will install metal corners or corner boards, window units, outside door frame, hang doors, and install locksets. Having performed all the various types of work on the house thus far and done a commendable job, we feel that you can succeed equally well on this unit. Continue, now by reading the General Objective for the unit and the Specific Objective for each task package within the unit. Proceed, then, to the Learning Activity, which gives you information on what you are to do and how you are to proceed in accomplishing the tasks.

OBJECTIVES:

General:

Upon completion of this unit you will be able to cut and install exterior wall finish including windows and door units.

OBJECTIVES (cont'd):

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Cut and install insulation board on exterior walls of a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:
    a. joints are staggered and positioned on stud centers.
    b. board is correctly nailed according to type of material, choosing type of fasteners and their spacing.
    c. board correctly installed with respect to proper positioning and joint tightness (depending upon type of material and its dimensions).
    d. end joints of board fit together tightly (depending upon type of material and type of application).

Your performance will be evaluated in accordance with the instructor's checklist.

2. Cut and install wall sheathing on exterior walls of a residential structure according to plans and specifications provided by the instructor maintaining the following standards:
    a. joints are staggered and positioned on stud centers.
    b. sheathing correctly nailed according to type of material (type of fasteners and their spacings).
    c. diagonal sheathing installed at a 45° angle from the horizontal (± 1°).

OBJECTIVES (cont'd):

d. joints are tight (space in joints does not exceed 1/8" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

3. Cut and install horizontal siding on exterior walls of a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

a. joints are staggered and positioned on stud centers (± 1/16").

b. siding is correctly nailed (type of fasteners and their spacings).

c. siding is correctly installed with respect to proper positioning and joint tightness (depending upon type of material and its dimensions).

d. end, corner, and trim joints are properly finished and fit together tightly (depending upon type of material and application).

e. if required, water table and drip cap are properly constructed and installed.

f. siding is free of unsightly splits and dents caused by faulty handling or hammering.

Your performance will be evaluated in accordance with the instructor's checklist.

4. Cut and install a fascia board on a residential structure according to plans and specifications given by the instructor, maintaining the following standards:

OBJECTIVES (cont'd):

a. fascia is properly cut (± 1/16"), positioned, and secured.

b. all joints between fascia and roof sheathing are tight (do not exceed 1/16" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

5. Cut and install plywood boxing (plancier or soffit) on a residential structure according to plans and specifications given by the instructor, maintaining the following standards:

a. plancier is properly cut (± 1/16"), positioned, and secured.

b. all joints between plancier and fascia and plancier and wall sheathing are tight (do not exceed 1/16" in width).

c. if required, vents in plancier are properly installed.

Your performance will be evaluated in accordance with the instructor's checklist.

6. Cut and install plywood for sealing the rake, on a residential structure according to plans and specifications given by the instructor, maintaining the following standards:

a. rake soffit is properly cut (± 1/16"), positioned and secured.

b. all joints between the fascia and the wall sheathing are tight (do not exceed 1/16" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVES (cont'd):

7. Cut and install bed molding between eave and sidewall on a residential structure according to plans and specifications given by the instructor, maintaining the following standards:
    a. bed molding is properly cut (± 1/16"), positioned and secured.
    b. joints between the bed molding, rake soffit, and siding are tight (do not exceed 1/16" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

8. Cut and install corner boards or metal corners on a residential structure according to plans and specifications given by the instructor maintaining the following standards:
    a. corner boards are properly assembled, cut to length (± 1/16"), and attached to the structure (proper fasteners).
    b. metal corners are to be installed in accordance with the procedure outlined on page 257 in Modern Carpentry.

Your performance will be evaluated in accordance with the instructor's checklist.

9. Install window units on exterior walls of a residential structure according to plans and specifications given by the instructor, maintaining the following standards:
    a. strips of building paper are tucked around rough wall openings.
    b. frame is centered (± 1/16") in the rough opening and is plumb (± 1/32").

OBJECTIVES (cont'd):

c. frame is correctly attached in the rough opening with the appropriate fasteners according to manufacturer's installation instructions.

d. weather stripping and/or caulking is correctly applied to make the window unit weatherproof.

Your performance will be evaluated in accordance with the instructor's checklist.

10. Install an outside entrance door frame in a residential structure according to plans and specifications given by the instructor, maintaining the following standards:

a. strips of building paper are tacked around rough wall openings.

b. frame is centered (± 1/16") in the rough opening.

c. head jamb and sill are level (± 1/32").

d. side jambs are plumb (± 1/32").

e. wedges are placed and secured between rough frame and door frame at hinge-set and lock striking plate locations.

f. distance between head jambs and rough floor is the same (± 1/16").

g. frame is properly nailed (8-16d box nails, 12"-16" o.c., 3/4" from outside edge of casings using nail set for final setting).

Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

11. Hang exterior doors in door frames of a residential structure according to plans and specifications given by the instructor, maintaining the following standards:

   a. door fits the shape of the door opening and has a clearance of 1/16" on each side, top, and bottom (± 1/32").

   b. hinges are properly positioned in opening (top hinge 5"-7" below head jamb, bottom hinge 10"-11" above threshold, middle hinge centered at midpoint between top and bottom hinges [± 1/8"]).

   c. hinge gains in door and jamb are properly cut to accommodate hinges (door gains set back 1/4" from face of door; depth of gains allows hinges to set flush; gains are square and cleanly cut).

   d. hinges are properly screwed into door and jamb.

   e. lock edge of door is beveled and all edges are planed or sanded smooth.

   f. door stops are correctly installed (hinge jamb stop has 1/16" clearance; lock stop is flush with outside edge of jamb).

   g. door opens and closes smoothly and is weatherproof when closed.

Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVES (cont'd):

12. Install exterior entrance lockset in an outside door of a residential structure according to plans and specifications by the instructor, maintaining the following standards:
    a. door lock and striking plate are properly installed (correct size hole is located and drilled).
    b. lock is mortised flush with door jamb.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on Exterior Wall Finish consists of twelve task packages which should be completed in order. Note the units that should be completed prior to beginning work on this one. As you perform the required work on each task package you will view a sound-slide package, do reading, answer questions, and complete other activities as directed.

The titles of the individual task packages within this unit are:

TASK PACKAGE 1: INSULATION BOARD
TASK PACKAGE 2: WALL SHEATHING
TASK PACKAGE 3: SIDING
TASK PACKAGE 4: FASCIA BOARD
TASK PACKAGE 5: BOXING IN EAVES

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 6: SEALING THE RAKE

TASK PACKAGE 7: BED MOLDING

TASK PACKAGE 8: CORNER BOARDS OR METAL CORNERS

TASK PACKAGE 9: WINDOW UNITS

TASK PACKAGE 10: OUTSIDE DOOR FRAME

TASK PACKAGE 11: HANGING DOOR USING BUTT HINGES

TASK PACKAGE 12: CYLINDER LOCK SET

If after reading this unit package, you determine that you can pass a comprehensive examination over the material covered in this unit, you should contact the instructor for the administration of this test. However, if you feel that you are not yet ready to be examined, proceed to complete the task packages as previously described.

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 1: INSULATION BOARD

PREREQUISITES: UNITS I-VII; UNITS IX-XI

RATIONALE:

You've heard of the draft board, haven't you? Have you heard of insulation board? Well, please don't insulate yourself from knowledge of insulation board.

Although some carpenters feel that exterior wall covering (insulation board or wall sheathing) should be installed before the roof covering, you installed the roof in order to provide protection from the weather for the interior of the house. Many initial exterior coverings could be used; however, you will install two types; they are insulation board and diagonal sheathing. This task package will be concerned with the insulation board which comes in a variety of thicknesses, widths, and lengths. It is used as an initial covering for the walls and provides strength, insulation, and a nailing surface for the final wall covering. In this task package you will learn how to install insulation board on the exterior walls according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install insulation board on exterior walls of residential structures according to plans and specifications supplied by the instructor, maintaining the following standards:

a. joints are staggered and positioned on stud centers (+ 1/8").

b. board is correctly nailed according to type of material, choosing type of fasteners and their spacing.

c. board correctly installed with respect to proper positioning and joint tightness (depending upon type of material and its dimension) (+ 1/8").

d. end joints of board fit together (depending upon type of material and type of application) (+ 1/8").

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-12-1, which is all right.
2. Read and study pages 148-151 in Modern Carpentry, beginning with the article entitled Wall Sheathing.
3. This concludes your Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Appropriate nails
3. Crosscut saw
4. Portable electric circular saw
5. Supply of insulation board
6. Framing square
7. Folding wood rule
8. Pencil

1. In consultation with the instructor and after having studied the plans, determine what thickness 4' x 8' sheet of insulation boards you are to use. NOTE - Make sure a special nail base fiberboard is selected.

2. The 4' x 8' insulation boards may be applied either vertically or horizontally. If applied horizontally, corner bracing is required; if installed vertically, bracing is usually not required.

3. Roofing nails of the appropriate length are selected, depending upon the thickness of the insulation board to be installed. See page 149 in Modern Carpentry for these specifications.
Note, also, the nailing patterns to be used on the insulation board.

4. Begin the application of the insulation board, starting at the bottom edge of the floor joists and/or headers. Fasten in place, using appropriate nailing pattern.

LEARNING PRACTICE (cont'd):

5. Boards should be spaced and centered on studs, leaving 1/8" between adjoining panels and at the end of panels.

6. Boards must be cut out around framed window and door openings. See Figure 8-24, page 191, in Modern Carpentry.

7. Continue the installation of these boards until you have sealed in the wall to the underside of the ceiling joists.

8. When satisfied with your accomplishment, contact your instructor for his evaluation.

9. Upon satisfactory completion of the installation of the insulation board, you will be directed to the next task package. It's like the student said, "I'd rather fight than switch task packages."

You will never become bored with an exciting career in carpentry.

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 2: WALL SHEATHING

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII, TASK PACKAGE 1

RATIONALE:

Are you learning all the angles? Ready to angle in on wall sheathing? Okay, the time is now.

As was mentioned in the previous task package, some carpenters feel that the wall covering should be applied before the roof is installed. You, however, provided protection from the weather by constructing the roof first. In the last assignment you learned how to install insulation board to the exterior wall; in this package you will learn how to apply diagonal wall sheathing to the exterior of your house. Many widths and lengths of boards may be used, but 3/4" thickness is the most common. The boards are applied to the wall on a 45° angle, with the joints lining up on the stud centers. Ready to try this on the angle wall sheathing? OK. Then draw your T-bevel and blast ahead by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install wall sheathing on exterior walls of a residential structure according to plans and specifications provided by the instructor maintaining the following standards:

a. joists are staggered and positioned on stud centers.

b. sheathing correctly nailed according to type of material. (type of fasteners and their spacings).

c. diagonal sheathing installed at a 45° angle from the horizontal (± 1°).

d. joints are tight (space in joints does not exceed 1/8" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-2, a grand extravaganza.
2. Read pages 148-151 in Modern Carpentry, beginning with the section entitled Wall Sheathing.
3. This concludes your Learning Activity; begin your Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d regular nails
3. Crosscut saw
4. Portable electric circular saw
5. Supply of lumber for diagonal sheathing
6. Folding wood rule
7. Combination square
8. T-bevel

1. After conferring with your instructor and studying the house plans, determine the thickness and width of the sheathing boards to be used.

2. In applying the sheathing boards, install them on a 45° angle and run in opposite directions from each corner, beginning at the bottom edge of the floor joist and/or header.

3. The boards must be cut with the end joints being staggered and occurring over the center of the studs.

4. Nail the boards in place, using the appropriate nails and nailing pattern. See page 151 in Modern Carpentry for this information.

5. Joints between boards and at their ends should fit tightly together and be nailed properly.

6. Boards must be cut out around framed window and door openings. See figure 8-32A, page 151, in Modern Carpentry.

7. Continue installing the diagonal sheathing until you have sealed in the wall to the underside of the ceiling joists.

LEARNING PRACTICE (cont'd):

8. Now, sheathing paper (or building paper) must be applied over the sheathing. Use the same procedure as you followed when you installed the felt upon the roof sheathing. If needed, refer to task package 8, Unit XI.
9. When you have checked your work against the Objective and feel ready, contact the instructor for his evaluation.
10. If you have completed the job in a satisfactory manner you will be directed to the next task package. Although you were working on an angle, you came out on top of the situation.

Congratulations!

Take care of your work - and your work will take care of you.

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 3: SIDING

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII, TASK PACKAGES 1-2

RATIONALE:

In carpentry, you can't afford to sidestep the siding. The siding is important to the outside of the house. Siding gives a finishing touch to a home.

Now that you have installed the insulation board or the diagonal wall sheathing, the next step is to apply the finish covering to the walls. This covering may take the form of many types of siding materials. Today, siding comes in many shapes and forms and may be made from wood, metal, pressed board, plastic, and asbestos, to name only a few. The siding is generally applied to the wall in either a vertical or horizontal pattern. However, sometimes, these patterns are combined and, also, quite often siding is combined with masonry construction material such as brick or stone. In this task package you will learn how to cut and install horizontal siding on the exterior walls of your house according to plans and specifications. Ready to apply yourself? Do it to the siding instead, by first reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install horizontal siding on exterior walls of a residential structure according to plans and specifications supplied by the instructor maintaining the following standards:

a. joints are staggered and positioned on stud centers (± 1/16").

b. siding is correctly nailed (type of fasteners and their spacings).

c. siding is correctly installed with respect to proper positioning and joint tightness (depending upon type of material and its dimensions).

d. end, corner, and trim joints are properly finished and fit together tightly (depending upon type of material and application).

e. if required, water table and drip cap are properly constructed and installed.

f. siding is free of unsightly splits and dents caused by faulty handling or hammering.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-3, a super-duper show.
2. Read pages 253-259 in Modern Carpentry, beginning with section entitled Wall Finish and ending with Vertical Siding.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Coated nails to match siding
3. Combination square
4. Folding wood rule
5. Fine tooth crosscut saw
6. Portable electric circular saw
7. Block plane
8. Chalk line & chalk
9. Supply of siding material

1. Discuss siding and its installation with your instructor. Through this discussion and a study of the plans, determine what type siding to use, its thickness, width, length, and the size nails to use in application.
2. The following are some general items to consider before actual installation begins.
    a. When the structure includes a gable roof, the wall surface material is usually applied to the gable end before the louver section is covered.

LEARNING PRACTICE (cont'd):

b. If solid wood, plywood, or nail base fiberboard was used as sheathing, the siding may be nailed directly to the sheathing at about 24" intervals. End joints in the siding may occur between the framing members.

c. If a non-nailing base material was used as sheathing, the siding should be attached by nailing through the sheathing and into the frame.

d. Before application of siding, flashing should be installed where it is required around openings. (See page 256, figure 12-17, in Modern Carpentry for an illustration of this procedure.)

e. The siding may be applied either from the bottom of the house upward or from the top downward. Find out from your instructor the method that is to be used.

3. The items included below will serve to guide you in the installation of the siding.

   a. To install horizontal siding, first prepare a story pole and then lay out your house at each outside corner and along the window and door casings. (See page 256 in Modern Carpentry for details of this procedure.)

   b. At these layout points you may set nails so that chalk lines may be attached for use in aligning the siding and marking the sheathing.

LEARNING PRACTICE (cont'd):

c. After layout has been carefully checked, start the application of the siding. (See page 257, figure 12-21, in Modern Carpentry for this procedure.)

d. Each successive layer of siding should overlap the previous one and be nailed as indicated on page 258 and illustrated in figure 12-25 in Modern Carpentry.

e. By the way, in handling long pieces of siding you should watch where you are going. See figure 1. We're not sure whom he was watching.

f. On the corners of your house, use either metal corners or corner boards. (See page 257 in Modern Carpentry for illustrations.)

g. Cut and fit horizontal siding tightly against window and door casings, corner boards (if used), and adjoining boards. (Refer to page 257 in Modern Carpentry for this procedure.)

h. Square butt joints are used between adjacent pieces of siding and should be staggered as widely as possible in successive courses.

4. After your siding job has been completed and you have judged your work in terms of the Objective, contact your instructor for his evaluation.

LEARNING PRACTICE (cont'd):

5. If your installation of the siding was done in a satisfactory manner, you will be directed to the next task package. Installation is your game and application should be your name. Congratulations for a job well done! Success is a play. Keep rehearsing.

WATCH
WHERE
YOU'RE
GOING

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 4: FASCIA BOARD

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII, TASK PACKAGES 1-3

RATIONALE:

Let's face the fascia of the house. It's a member which is installed early in the construction of the cornice. And that's not corny.

The cornice or eave of the house is formed by the roof overhang and provides a finished connection between the wall and edge of the roof. The cornice is important to the total appearance of the house, with the architectural style determining to a great extent the design requirements. Perhaps the first member to install in the construction of the cornice is the fascia board, which is the main trim member along the edge of the roof. The fascia is installed on the end of the rafters and fits up under the roof sheathing. In this task package you will learn how to cut and install fascia board on your house from plans and specifications. Continue, now, by reading the Objective and performing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install fascia board on a residential structure according to plans and specifications given by the instructor maintaining the following standards:

a. fascia is properly cut (± 1/16"), positioned, and secured.

b. all joints between fascia and roof sheathing are tight (do not exceed 1/16" in width.)

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-4, a whizz thriller.
2. Read and study pages 249-253 in Modern Carpentry, ending with the section entitled Wall Finish. Take careful note of material referring directly to the fascia board.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Finish nails
3. Combination square
4. Crosscut saw
5. Portable electric circular saw
6. Folding wood rule
7. Pencil
8. Lumber for fascia board
9. T-Level

1. Refer to the plans and specifications to determine the size of lumber to be used in the construction of the fascia.

2. Boards selected for the fascia should be straight, true, and level because they will be installed on the perimeter of the roof frame, being attached to the ends of the rafters and fitting under the roof sheathing. (See pages 250-251, figures 12-1, 12-2, and 12-3, in Modern Carpentry.)

3. Joints must be well fitting and be formed over the center of the end of a rafter. Corners should be mitered and end joints should meet at a 45° angle as illustrated in figure 12-5, page 251, in Modern Carpentry.

4. In the installation of the fascia boards, the following procedure should be followed:

   a. The fascia should be cut to the correct width if necessary. (See the plans for width needed.)

   b. Cut the proper angle on the edge of the fascia that fits

LEARNING PRACTICE (cont'd):

against the roof sheathing. (See figure 12-3, page 251, in Modern Carpentry.)

c. Attach the fascia to the rafters, making sure that it fits flush against the roof sheathing and is nailed with the appropriate finish nails. (Probably three nails should be driven into each rafter.)

d. Where joints occur they should be cut and nailed as pictured in figure 12-5, page 251, in Modern Carpentry.

e. Continue the installation of the fascia until you have applied it in all the necessary places.

5. After you are satisfied with your finished work, seek the evaluation of your instructor.

6. Upon satisfactory completion of the finished job, you will be directed to the next task package. You have just completed an important first step in the construction of the cornice. Fascia up to the next assignment.

A good attitude makes the difference so let's be positive; it will add a plus to your personality.

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 5: BOXING IN EAVES

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII, TASK PACKAGES 1-4

RATIONALE:

Do you enjoy boxing? At the Y or in the gym? How about boxing in eaves?

As a part of the cornice or eave, you have already cut and installed the fascia board on the ends of the rafters, fitting it up under the roof sheathing. The next step is to box in the eaves or to install the plancier or soffit, which is usually a wide piece of plywood, sealing in the area underneath the rafters and between the fascia board and the wall of the house. Other structural members such as ledger strips and lookouts need to be installed in order to provide the plancier or soffit with a surface to which it may be attached. In this task package you will learn how to cut and install plywood boxing in the eave according to plans and specifications. Continue by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install plywood boxing (plancier or soffit) on a residential structure according to plans and specifications given by the instructor maintaining the following standards:

a. plancier is properly cut (± 1/16"), positioned, and secured.

b. all joints between plancier and fascia and plancier and wall sheathing are tight (do not exceed 1/16" in width).

c. if required, vents in plancier are properly installed.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-5. This is a multi-package, since it will be used for this task package and also for packages 6 and 7 of this unit.
2. Read and study pages 249-253 in Modern Carpentry, noting particularly those areas dealing with cornice construction.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Nails of appropriate sizes
3. Carpenter's level
4. Combination square
5. Folding wood rule
6. Pencil
7. Crosscut saw
8. Framing square
9. Plywood for plancier or soffit
10. 2 x 4's for ledgers and lookouts

1. Consult with your instructor and study the plans to determine the thickness, width, and length of the plancier or soffit. Also determine the number and sizes of the ledgers and lookouts.
2. To frame a cornice with a horizontal soffit, first install a ledger strip along the wall. Use a carpenter's level for locating placement of the ledger; snap a chalk line, and nail the ledger in place. See page 250 in Modern Carpentry for this procedure.
3. Next, cut and install the lookouts on to the ledger strips and the rafters according to the procedure covered on pages 250-251 in Modern Carpentry.
4. If thin material is used for the soffit you should attach a nailing strip along the underside of the fascia to provide a nailing surface.
5. If additional ventilation is required for the house, these vents

LEARNING PRACTICE (cont'd):

may be placed in the soffit or plancier prior to its being installed into place. See pages 252-253 in Modern Carpentry for illustrations of these vents in use.

6. After the frame, composed of the ledgers, lookouts, and nailing strips or the fascia, install the soffit into place with nails or screws that are rust resistant, following the procedure outlined on pages 252-253 of Modern Carpentry.
7. Continue the installation of the plancier, making sure that the joints between the fascia and the plancier and the plancier and the wall sheathing are tight. Also, make the joints between each section of the plancier tight fitting.
8. After you are satisfied with your job of boxing in the eaves, contact the instructor for his evaluation.
9. Upon satisfactory completion of this work you will be directed to the next task package.

From the fascia to the wall, from the ledger to the soffit, the other students had better lookout for you. Good show! Don't box yourself in. Expand your horizon in carpentry.

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 6: SEALING THE RAKE

PREREQUISITES: UNITS I-VII; UNITS IX-XI, UNIT XII, TASK PACKAGES 1-5

RATIONALE:

Step right up and learn about the rake, but not the kind you rake leaves with. This is a very different type of rake. So let's leave the leaf rake and take a look at this rake.

In the previous task package you installed the plywood boxing in the eaves or completed the cornice, as it is frequently called. If on the gable ends of the house there is also an overhang, it is known as the rake. The trim used for a box or sealed rake section requires the support of the projecting roof boards. In addition, lookouts or nailers are fastened to the side wall and the roof sheathing. To complete the rake section you would add a fascia board and a soffit similar to the manner in which you did it on the eaves. If the rake projects a considerable distance and the sheathing does not provide adequate support, additional roof framing should be provided. Ready to go boxing again? This time do it to the rake on the gable end of your house. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install plywood for sealing the rake on a residential structure [illegible] plans and specifications given by the instructor maintaining the following standards:

a. rake soffit is properly cut (± 1/16"), positioned, and secured.

b. all joints between the fascia and the wall sheathing are tight (do not exceed 1/16" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-5. This is a rerun but better than a summer TV rerun. Watch it again.

2. Read pages 249-253 in Modern Carpentry, ending your reading with the section entitled Wall Finish. Note particularly the material directly concerned with the rake section of the house.

3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Appropriate size nails
3. Combination square
4. Crosscut saw
5. Portable electric circular saw
6. Plywood for soffit
7. 2 x 4's for lookouts
8. Stock for fascia

1. Discuss rake construction with your instructor, and study the house plans to determine the extent of the overhang on the gable ends of the house, the size and amount of materials, and the type of rake boxing needed.

2. Construct the framing for an extended roof rake at a gable end, if it were not already done in task package 5, Unit XI. (See page 167, figure 9-22, in Modern Carpentry for an illustration of this type of framing.)

3. If the framing was not previously installed, use the following procedure:

   a. Attach two additional rafters to the overhanging ridge board and to the fascia board extended out past the end of the house. (See figure 9-22, page 167, in Modern Carpentry.)

   b. Lookouts may now be attached to the side wall and the added rafters as shown in figure 12-4, page 251, in Modern Carpentry, or they may be attached to the last rafters on the roof and to the two additional rafters you added. (See figure 9-22,

LEARNING PRACTICE (cont'd):

page 167, in Modern Carpentry for an illustration of this procedure.)

4. After the framing has been constructed, the rake is now ready to be sealed or boxed in. Use the following steps in accomplishing this task:

   a. Cut and install an appropriate piece of plywood to the lookouts as the rake soffit, using rust resistant nails or screws. The soffit should fit against the wall sheathing and be flush with the added rafters. (See figure 12-4, page 251, in Modern Carpentry.)

   b. Continue installing soffit material until the rake has been boxed in. NOTE - Make sure that the joints of the soffit fit flush and true.

   c. Install the fascia boards onto the outside of the added rafters and against the rake soffit.

5. This completes the installation of the boxing in the rake. All other gable overhangs may be completed in the same manner.

6. When you are satisfied with your work, contact the instructor for his evaluation.

7. Upon satisfactory completion of the job, you will be directed to the next task package.

When you rake all the required skills together, you'll be an expert and prosperous carpenter.

BEST COPY AVAILABLE

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 7: BED MOLDING

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII, TASK PACKAGES 1-6

RATIONALE:

Stay out of those moldy beds. But you'd better learn about bed molding. That's something a skilled carpenter knows how to install.

After the cornice and rake sections of the house have been installed there remains only one more step to complete these sections. A molding called the bed molding on the gable ends of the house, and the frieze molding on the front and back of the house, must now be assembled in place. These two moldings serve the same purpose; that is, to seal in the area between the soffit and the siding. These strips of molding may cover a slight open space between the soffit and the siding, but equally important is the fact that the molding also adds beauty to the finished house. Let's install these pieces of molding in place and complete the cornice and rake sections. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install bed molding between eave and sidewall of a residential structure according to plans and specifications given by the instructor maintaining the following standards:

a. bed molding is properly cut (± 1/16"), positioned, and secured.

b. joints between the bed molding, the rake soffit, and the siding are tight (do not exceed 1/16" in width).

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-5. This is a rerun also, but it is worth watching and listening to again.
2. Read pages 249-253 in Modern Carpentry, noting particularly the material on the bed molding and frieze.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Finish nails

LEARNING PRACTICE (cont'd)

3. Combination square
4. Crosscut saw
5. Stock for bed molding
6. Stock for frieze
7. Radial arm saw

1. Consult the plans and determine what are the type and shape of the bed molding and frieze.

2. On some houses extensive use of moldings is made; sometimes as many as two or three pieces of variously shaped moldings are used in the corners to cover irregularities; however, in modern construction their use is usually held to a minimum in order to maintain a smooth trim appearance.

3. In reference to number 2 above, only single strips of molding are usually installed.

4. At the gable ends of the house, install the bed molding (see plans for size and shape) in the corners between the rake soffit and the siding. (See figure 12-4, page 251, in Modern Carpentry.)
    a. The bed molding should fit tightly into the corners and be nailed with rust resistant finish nails.
    b. All joints should be mitered and fit tightly together.
    c. Continue installation until all bed molding is in place.

5. At the front and back of the house, install the frieze boards in place (see plans for size and shape) in the corners formed by the cornice soffit and the wall sheathing. (See figure 12-3, page 251, in Modern Carpentry.)

LEARNING PRACTICE (cont'd):

a. The frieze molding should be installed tightly into place in the corners between the soffit and the wall sheathing and nailed with rust resistant finish nails.

b. All joints in the frieze board should be mitered and fitted tightly together.

c. Continue with the installation until all the frieze boards are in place.

6. When you have checked your work thoroughly, ask the instructor for his evaluation.

7. Upon satisfactory completion of the installation of this molding, you will be directed to the next task package. In your work thus far in the carpentry course you no doubt have observed many violations of safety rules. See how many violations you can pick out of figure 1 of this task package.

Did you realize how much you have learned? Think back to the first week when you probably didn't know the difference between a block plane and an airplane.

UNSAFE PRACTICES

Can you find twenty unsafe practices? If not, you do not know your safety regulations.

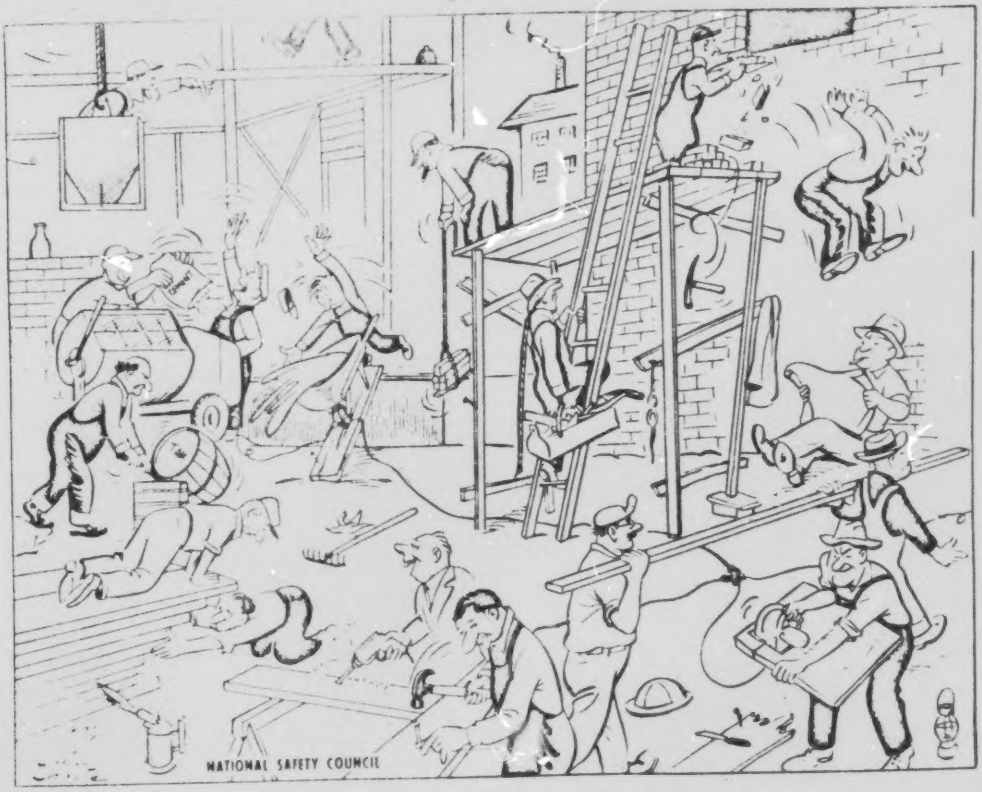

NATIONAL SAFETY COUNCIL

Figure 1

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 8: CORNER BOARDS OR METAL CORNERS

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII, TASK PACKAGES 1-7

RATIONALE:

Don't board yourself up in a corner, and don't corner yourself with boards. But pause here to study corner boards or metal corners.

In addition to installing the bed molding and frieze molding, the carpenter may also be required to install outside wall corner boards or outside metal corners. Both of these types of corner fittings serve two major purposes. First, they cover the raw edges of the siding and, secondly, they cover the corners of the house, producing a pleasing appearance. In this task package you will learn how to cut and install corner boards or metal corners on a house according to plans and specifications. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install corner boards or metal corners on a residential structure according to plans and specifications given by the instructor maintaining the following standards:

a. corner boards are properly assembled, cut to length (± 1/16"), and attached to the structure (proper fasteners).

b. metal corners are to be installed in accordance with the procedure outlined on page 257 in Modern Carpentry.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ________, which is really super.
2. Read page 257 in Modern Carpentry, noting carefully the text and illustrations concerning corner boards and metal corners.
3. This concludes your Learning Activity; begin your Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Appropriate nails

LEARNING PRACTICE (cont'd):

3. Crosscut saw
4. Combination square
5. Material for corner boards
6. Material for outside metal corners

1. Study the plans of the house to determine whether you are to use corner boards or outside metal corners.

2. If corner boards are to be installed, the following procedure should be used:

   a. Attach two pieces of lumber together (thickness depending on siding), cut to the proper lengths and then install the assembly to the outside corner of the house. (See figure 12-24, page 257, in Modern Carpentry for an illustration of this type of corner board.)

   b. Nail the corner board in place with corrosive resistant finish nails.

   c. After the corner boards are in place, the siding is fitted tightly against them. NOTE - Large outside corner molding may be used for the corner board and may be purchased from the lumber company.

3. If outside metal corners are to be installed, the following procedure should be used.

   a. Select the appropriate length of metal corners, dependent upon the width of the siding used.

   b. Install the metal corners in place, nailing them as indicated

LEARNING PRACTICE (cont'd):

in figures 12-22 and 12-23, page 257, in Modern Carpentry.

c. Continue to apply the outside corners until they have all been installed in place.

4. After you have checked your work, secure the evaluation of the instructor.

5. Upon satisfactory completion of the job, you will be directed to the next exercise. You stand an excellent chance of being the best student in the carpentry class.

It appears you're going to get a corner on the market in carpentry skills.

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 9: WINDOW UNITS

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII, TASK PACKAGES 1-8

RATIONALE:

Watch out for those swinging windows! You knew all about swinging doors, but did you realize that some windows are real swingers, too? Learn about them here.

Because windows and doors are such an important part of a structure, the carpenter should have a basic understanding of the various types, sizes, and standards of construction available. Today, windows are fabricated in large manufacturing plants and then shipped to the building site as completed units ready to be installed in the framed openings. Windows may be made from materials such as aluminum, steel, and wood, with most of them made of wood. In general, windows may be classified as sliding, swinging, and fixed. Probably the most common window in use in residential building today is the sliding double hung window. This window consists of two sashes that slide up and down in the window frame and is extensively used because of its economy, simplicity of operation, and adaptability to many architectural designs. In this task package you will learn how to install window units in exterior walls according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to install window units on exterior walls of a residential structure according to plans and specifications given by the instructor maintaining the following standards:

a. strips of building paper are tucked around rough wall openings.

b. frame is centered (± 1/16") in the rough opening and is plumb (± 1/32").

c. frame is correctly attached in the rough opening with the appropriate fasteners according to manufacturer's installation instructions.

d. weather stripping and/or caulking is correctly applied to make the window unit weatherproof.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ____________________________, a terrific production.
2. Read pages 215-233 in Modern Carpentry, ending with the article entitled Glass Blocks. Note particularly those sections concerned with installing windows.

LEARNING ACTIVITY (cont'd):

3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Appropriate nails
3. Combination square
4. Crosscut saw
5. Carpenter's level
6. Framing square

1. Consult with the instructor and study the plans carefully to determine the types and sizes of windows which are to be installed.
2. The kinds of windows you will install come in units and should be handled and stored carefully until ready for use. (See page 225 under section entitled Installing Windows in Modern Carpentry for this procedure.)
3. When installing a window unit the following procedure should be followed: NOTE - All pages or figures referred to hereafter will come from Modern Carpentry.
    a. Check the rough opening to make certain it is the correct size (see page 225 for the size), and then tack a piece of building paper around the inside of the rough opening.
    b. Secure sufficient help and carry the window to the opening, placing it in position from the outside. (See figures 11-33 and 11-34, page 230.)

LEARNING PRACTICE (cont'd):

c. Place wedge blocks under the sill and raise the frame to the correct height (see your house plans). Adjust the wedges so the frame is perfectly level, using additional wedges if necessary (refer to pages 229 and 230 for this procedure.)

d. Nail through the lower end of the side casing to secure the bottom of the frame in place.

e. Plumb the side jambs with the carpenter's level and check the corners with a framing square.

f. Drive nails temporarily into top of side casing. Check to see if window is square and level. (See pages 229-230.)

g. Nail window permanently in place with proper size nails following procedure outlined on page 230.

h. Apply weather stripping or caulking according to the window manufacturer's specifications so that the window unit will be waterproof.

i. Follow the procedure outlined in "a" through "h" for each window unit you need to install.

4. Check your finished work to make sure it has been done correctly, and then seek the evaluation of your instructor.

5. Upon satisfactory completion of this job, you will be directed to the next assignment. Good carpenters are always in demand; take pride in your work and there will be a demand for you! Keep opening the windows of your mind to new carpentry skills.

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 10: OUTSIDE DOOR FRAME

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII; TASK PACKAGES 1-9

RATIONALE:

Don't frame yourself outside the door with this package. Just put an outside frame around the door.

As you know, doors and windows are an important part of a structure, and as such the carpenter should have a basic understanding of them. He should understand such things as the various types, sizes, and standards of construction available. Outside door frames are installed at the same time as windows and they follow similar procedures. Secondary and service entrances usually consist of simple frames and trim members that match the windows. Main entrances, however, are usually somewhat more elaborate. Door frames, for the most part, are installed the same; so, when you have learned how to install one, you can usually install any others. In this task package you will learn how to install an outside entrance door frame according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to install an outside entrance door frame in a residential structure according to plans and specifications given by the instructor in accordance with the following standards:

a. strips of building paper are tacked around rough wall openings.

b. frame is centered (± 1/16") in the rough opening.

c. head jamb and sill are level (± 1/32").

d. side jambs are plumb (± 1/32").

e. wedges are placed and secured between rough frame and door frame at hinge-set and lock-striking plate locations.

f. distance between head jambs and rough floor is the same (± 1/16").

g. frame is properly nailed (8-16d box nails, 12" - 16" o.c., 3/4" from outside edge of casings, using nail set for final setting).

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-10, a real winner.

2. Read pages 238-243 in Modern Carpentry, beginning with section

LEARNING ACTIVITY (cont'd):

entitled Exterior Door Frame and ending with Sliding Glass Doors.

3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer	5. Wooden wedges
2. Appropriate size nails	6. Wooden straight edge
3. Crosscut saw	7. Door frame
4. Carpenter's level	8. Door sill

1. Study the plans and consult with the instructor to determine the size of the exterior frame to be installed.
2. The following items must be understood before actual installation takes place:
   a. In residential construction outside doors swing inward.
   b. Sill design varies considerably; however, the top is always level with the surface of the finished floor.
   c. The outside surface at the entrance is placed just below the door sill or lowered by a standard riser. (See figure 11-58, page 240, in Modern Carpentry.)
3. The items that are listed below should be followed when installing a door frame:
   a. Check the size of the rough opening to assure that the proper clearances have been provided.

LEARNING PRACTICE (cont'd):

b. Cut out sill area to the proper height. (See pages 240 and 243 in Modern Carpentry for the procedure.)

c. Place the frame in the opening, center it horizontally, and secure it with a temporary brace.

d. Using blocking and wedges, level the sill and bring it to the required height. (See page 243 in Modern Carpentry.)

e. After the sill has been leveled, drive a nail through the casing into the wall frame at the bottom of each side.

f. Install wedges between the studs and top of door jambs and adjust until they are plumb. (See figures 11-60, page 240, in Modern Carpentry.)

g. Drive additional wedges between the jambs and stud frame in the approximate location of the lock-strike plate and hinge. (See figure 11-60, page 240, in Modern Carpentry.)

h. Adjust the wedges until the side jambs are well supported and straight. Secure wedges in place by nailing, and finally nail the casing in place, following the procedure given on page 243 in Modern Carpentry.

4. Check your finished work to determine if it has been correctly done. When ready, seek the instructor's evaluation.

5. Upon satisfactory completion of the door frame installation, you will be directed to the next assignment.

Nobody else frames it the way you frame it. Good job.

UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 11: HANGING DOOR USING BUTT HINGES

PREREQUISITES: UNITS I - VII; UNITS IX - XI; UNIT XII, TASK PACKAGES 1-10

RATIONALE:

Are you really hanging in there? Good. Now, here's your chance to hang something else in there, and your success as a carpenter will hinge on this and other task packages.

Installing door frames and hanging doors are an important part of the carpenter's competencies. There are many things that indicate the skill of a carpenter, not least of which is a properly hung door. You no doubt have seen an improperly hung door, causing it to bind or at least look tilted to one side. Exterior and interior doors are hung by essentially the same procedure. In this task package you will learn how to hang an exterior door using butt hinges. To begin the hanging process, you should first read the Objective and do the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to hang exterior doors in door frames of a residential structure according to plans and specifications given by the instructor maintaining the following standards:

a. door fits the shape of the door opening and has a clearance of 1/16" on each side, top, and bottom (± 1/32").

b. hinges are properly positioned in opening (top hinge 5" - 7" below head jamb, bottom hinge 10" - 11" above threshold, middle hinge centered at midpoint between top and bottom hinges) (± 1/8").

c. hinge gains in door and jamb are properly cut to accommodate hinges (door gains set back 1/4" from face of door; depth of gains allows hinges to set flush; gains are square and cleanly cut).

d. hinges are properly screwed into door and jamb.

e. lock edge of door is beveled and all edges are planed or sanded smooth.

f. door stops are correctly installed (hinge jamb stop has 1/16" clearance; lock stop is flush with outside edge of jamb).

g. door opens and closes smoothly and is weatherproof when closed.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-10; this is a rerun but a very good show. View it again.
2. Read pages 368-370 in Modern Carpentry, from section entitled Door Installation to section entitled Door Locks.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Nails
3. Chisels
4. Screws & butt hinges
5. Screw driver
6. Jack plane
7. Folding wood rule
8. Pencil
9. Combination square
10. Electric plane
11. Electric router

1. Study the plans and consult with the instructor to determine the type and size of the exterior doors to use.
2. The following are general items that should be considered when hanging an outside door:
   a. Determine the type of door to be used and the direction in which it will open.
   b. Trim the door to fit the outside entrance door frame. (See page 368 in Modern Carpentry.) Provide clearances as specified.
   c. Plane a bevel on the lock side of the door to provide clearance

LEARNING PRACTICE (cont'd):

for the edge when it swings open. (See page 369 in Modern Carpentry for specifications.)

3. The following steps should be followed when installing the hinges and hanging the door:
   a. Gains for hinges may be cut with an electric router using a door and jamb template to save time and insure accuracy. (See pages 369-370 in Modern Carpentry for this procedure.)
   b. Cut out top hinge 5 - 7" below head jamb, bottom hinge 10 - 11" above threshold, and the middle hinge centered between the other two.
   c. Insert the hinges into the gains with the loose pin of the hinge toward the top of the door when the door is in the operating position.
   d. Screw the hinges into place using the procedure outlined on page 369 in Modern Carpentry.
   e. Attach the free leaf of the hinge to the jamb. Follow the procedure covered on page 369 in Modern Carpentry.
   f. After all hinges are installed, hang the door in place and check the clearance on all edges, making necessary corrections following the procedure in Modern Carpentry, page 369.
   g. With the door in position, install the door stops as outlined on page 370 in Modern Carpentry.

LEARNING PRACTICE (cont'd):

h. The preceding steps may be followed generally in the installation of hinges and the hanging of any outside door.

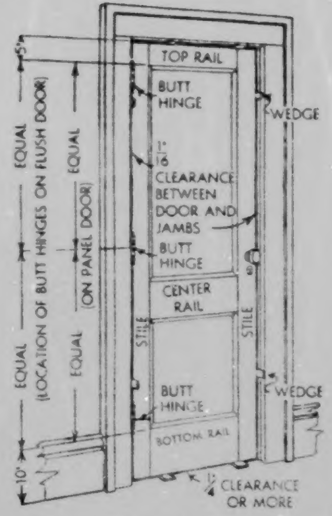
4. The attached sheet at the end of this task package also gives the procedure for installing hinges and hanging a door. NOTE - A chisel has been used for cutting out the gains into which the hinges fit.
5. Check your finished work to make sure it has been correctly done. When you are satisfied contact your instructor for his evaluation.
6. Upon satisfactory completion of the job you will be directed to the next task package. Congratulations! You have now done something very few of your friends can do. Good show!

Remember - the hills are not as steep as they seem.

HOW TO USE

THE STANLEY BUTT GAUGE

AND HOW TO HANG A DOOR WITH STANLEY BUTT HINGES

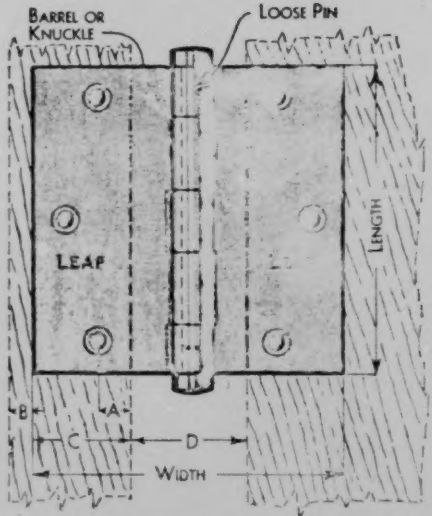

TOP RAIL
BUTT HINGE
1/16" CLEARANCE BETWEEN DOOR AND JAMBS
BUTT HINGE
CENTER RAIL
STILE
STILE
BUTT HINGE
BOTTOM RAIL
WEDGE
WEDGE
1/4" CLEARANCE OR MORE
5"
10"
EQUAL
EQUAL
(LOCATION OF BUTT HINGES ON FLUSH DOOR)
EQUAL
EQUAL
(ON PANEL DOOR)

Stanley Wrought Steel Butt Hinge No 241 3½"x3½"

LOOSE PIN BUTT HINGE SPECIFICATIONS FOR WOOD DOORS

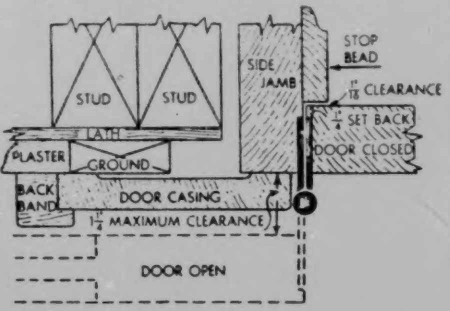
Doors larger than 5 ft should have three butt hinges, one for each 2½ ft of height

Size and Type of Door		Size of Butt Hinge
3/4" 7/8" Cupboard Doors	up to 24" wide	2½"
7/8" to 1 1/8" Screen Doors	up to 36"	3"
1 1/8" to 1 3/8" Doors	up to 32"	3½"
	over 32" to 37"	4"
1 3/8", 1 3/4", 1 7/8"	up to 32" wide	4½"
	over 32" to 37"	5"
	over 37" to 43"	5" ex heavy
	over 43" to 50"	6" ex heavy
2", 2 1/4", 2 1/2"	up to 43" wide	5" ex heavy
	over 43" to 50"	6" ex heavy


BARREL OR KNUCKLE
LOOSE PIN
LEAF
LENGTH
B
A
C
D
WIDTH

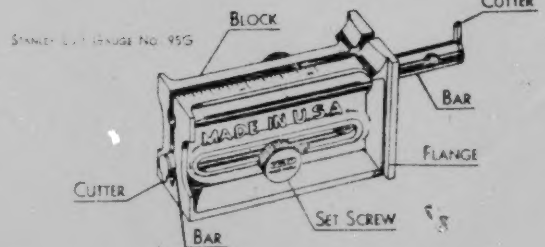
A. Keep this distance sufficient to prevent splitting
B. Set back enough to prevent splitting when chiseling
C. Width of the gain
D. Maximum clearance when door is open

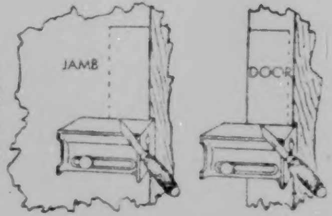
APPLICATION OF 3½"x3½" BUTT HINGE


STUD
STUD
SIDE JAMB
STOP BEAD
1/16" CLEARANCE
1/4" SET BACK
DOOR CLOSED
LATH
PLASTER
GROUND
BACK BAND
DOOR CASING
1¼" MAXIMUM CLEARANCE
DOOR OPEN

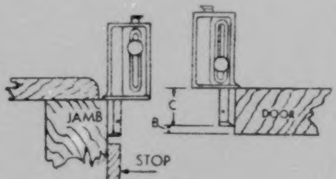
HOW TO HANG A DOOR

1. Saw off lugs (the projecting ends of the stiles) at top and bottom of door.
2. Plane the butt stile to fit side jamb. Plane to the correct width of the opening at top and bottom after subtracting 1/8" for clearance, or 1/16" for each side. The lock stile should be beveled slightly.
3. Plane door to fit at the top, then scribe and plane the bottom allowing 1/16" for clearance at the top and 1/4" or more at the bottom for rugs.
4. Wedge the door in place and mark the position of the butt hinges on the door and jamb at the same time, as illustrated.
5. Remove the door and square lines with the butt gauge for the length of the butt hinge or gain. Gauge the width of the gain and the depth of the gain with the butt gauge. Repeat on the jamb.
6. Chisel the gains as illustrated. See Stanley Chisel Charts No C17 and C18.
7. Draw the pins from the butt hinges and screw one leaf to the door and one to the jamb. See Stanley Screw Driver Chart No C21.
8. Put the door in position and slip the pins in place.
9. If the door hangs away from the jamb the gains should be deeper. If the door binds against the jamb place a piece of cardboard between the butt hinge and the bottom of the gain.
10. The stop beads should then be nailed in place, allowing clearance.

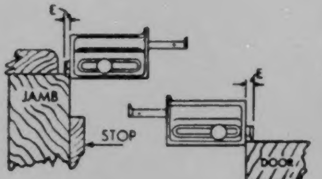

Stanley Butt Gauge No. 95G
BLOCK
CUTTER
BAR
FLANGE
MADE IN U.S.A.
CUTTER
SET SCREW
BAR



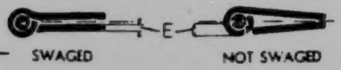
To square lines for the length of the gain, hold the flange of the butt gauge against the side of the door, or the jamb, and use it like a try square as shown in the illustration.

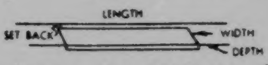

JAMB
STOP
C
B
DOOR

To gauge the width of the gain, adjust the gauge as shown for the dimension C. This is the thickness of the door less the set back B, usually 1/4".

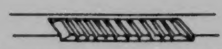

E
JAMB
STOP
E
DOOR

To gauge the depth of the gain, set the gauge for the thickness of the leaf of the butt hinge and mark the door and the jamb. The space between the leaves allows for clearance at the butt edge of the door. Most butt hinges are swaged for this clearance, but some small butt hinges are straight. For straight butt hinges set the gauge for slightly less than half the thickness of the barrel.


E
SWAGED
NOT SWAGED


LENGTH
SET BACK
WIDTH
DEPTH

Length width and depth of gain laid off



Gain scored and ends notched to aid in chiseling

Gain finished. The bottom smoothed by paring with chisel

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EDUCATIONAL DEPARTMENT
CHART NO. 31
By R. O. Reger

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UNIT XII: EXTERIOR WALL FINISH

TASK PACKAGE 12: ENTRANCE LOCK SET

PREREQUISITES: UNITS I-VII; UNITS IX-XI; UNIT XII, TASK PACKAGES 1-11

RATIONALE:

All good things must come to an end - and so does this unit. Here is your chance to lock up Unit XII and enter into Unit XIII by mastering the entrance lock set.

Now that you have installed the outside door frame and hung the outside door using butt hinges, the next and final job is to install the entrance lock set. Many types of lock sets may be chosen; however, the cylindrical and tubular locks are the most frequently used in modern residential work because they can be installed easily and quickly. In this task package you will learn how to install a cylindrical lock set in an outside door. This is very easily done by boring a large hole in the door face, a smaller hole in the edge, and a shallow mortise for the front plate. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to install the exterior entrance lock set in an outside door of a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

a. door lock and striking plate are properly installed (correct size hole is located and drilled).

b. lock is morticed flush with door jamb.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XII-10. This one has been shown twice before, but is better than a summer rerun, so watch it again.
2. Read and study pages 370-373 in Modern Carpentry, beginning with the section entitled Door Locks and ending with Thresholds and Door Bottoms.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Brace
3. Expansive bit
4. Wood chisel
5. Screwdriver

1. Check the plans to determine the type, size, and kind of lock set to be installed. Also, from the plans, determine the way in which the doors swing.
2. The direction of the swing of the door is referred to as the "Hand of the Door." The way the door opens determines the type of lock needed. See figure 17-29, page 372, for information concerning this.
3. Almost all cylindrical and tubular lock sets will be similar; however, the installation details will vary slightly. Therefore, one should always carefully follow the instructions furnished by the manufacturer.
4. The following steps are general but will apply to most cylindrical lock set installations.
   a. Open the door to a convenient position and block it with wedges placed underneath.
   b. Measure up from the floor 38" and mark a light horizontal line which will be on a level with the center of the lock.

LEARNING PRACTICE (cont'd):

c. Position the template (furnished with the lock set) and mark the centers of the two holes. See figure 17-30, step 1, page 372, in Modern Carpentry.

d. Install the latch unit by boring a 2 1/8" hole through door and 7/8" hole into edge of door at joints marked on template. Cut out for latch front and install latch unit. Refer to figure 17-30, step 2, in Modern Carpentry.

e. Install strike plate according to procedure shown in step 3, figure 17-30, in Modern Carpentry and on page 373.

f. Adjust and install lock according to the procedure outlined in figure 17-30 in Modern Carpentry.

5. Check your finished installation and, when satisfied, report to the instructor for his evaluation.

6. Upon satisfactory completion of the job you will be directed to the next unit; that is, since you now have this one locked down.

Well, you locked up Unit XII in very fine fashion. Now, unlock the new knowledge in Unit XIII. Remember you are the key to success.

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: CARPENTRY
COURSE: CARPENTRY

UNIT PACKAGE XIII: INTERIOR WALLS, CEILING, AND FLOOR FINISH

PREREQUISITES: UNITS I-VII; UNITS IX-XII

RATIONALE:

Since such a large portion of a home owner's time is spent inside the house there is the desire for the interior, not only to be beautiful but also be well insulated. The owner demands a high level of comfort in his home from the winter's cold and the summer's heat. Good quality insulating material helps provide the comfort desired and various types of ceiling, wall, and floor coverings add to the beauty required. In order that you will be able to provide for both function and beauty, the installation of sheetrock, wood panels, ceiling tile, hardwood flooring, underlayment board, and insulation material will be covered in this unit. You should now continue by reading the General Objective for the unit and the Specific Objective for each task package. Then, move directly to the Learning Activity, which will indicate to you what will be required and how you are to proceed in accomplishing the tasks.

OBJECTIVES:

General:

Upon completion of this unit you will be able to cut and install insulation, ceiling, wall, and floor covering materials.

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Cut, install, and staple insulation batts and roll blanket insulation in a residential structure according to plans and specifications given by the instructor, maintaining the following standards:
   a. batts are stapled in place between the ceiling joists with the vapor barrier facing downward.
   b. batts should be wedged between the joists and placed end to end touching one another.
   c. blanket insulation should be wedged between wall studs and be cut to fit against the top and bottom plate and stapled to the studs with the vapor barrier facing the inside of the room.

   Your performance will be evaluated in accordance with the instructor's checklist.

2. Cut and install sheetrock in a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

OBJECTIVES (cont'd):

a. when sheetrock is applied to the ceiling joists, the lengthwise joints of the sheets fall along the center of the joist (± 1/16").

b. sheetrock is nailed properly on each joist (using appropriate nails and spacing them 6" apart [± 2"]).

c. joints between sheets should show no more that 1/8" between them.

d. when sheetrock is applied to the walls the sheets should be placed lengthwise beginning at ceiling level, nailed properly (using appropriate nails and spacing them 6" apart [± 2"] on all studs).

e. joints between sheets should show no more than 1/8" between them.

Your performance will be evaluated in accordance with the instructor's checklist.

3. Cut and install wood panel sheets in a residential structure according to plans and specifications provided by the instructor, maintaining the following standards:

a. panels run vertically from floor to ceiling with the edges falling on the center of the studs (± 1/16").

b. joints between sheets show no more than 1/32" between them, and colored matching nails spaced 6" apart (± 2"), are used to attach panels to studs.

Your performance will be evaluated in accordance with the

OBJECTIVES (cont'd):

instructor's checklist.

4. Cut and install furring strips and ceiling tile in a residential structure according to plans and specifications provided by the instructor, maintaining the following standards:
   a. furring strips are cut to proper length (± 1/8") and are spaced 12" o.c. (± 1/16").
   b. furring strips are leveled with tapered shims (± 1/16") and nailed on each ceiling joist.
   c. strips are located closer along wall to accommodate narrower width of border tile.
   d. border tiles are installed along a chalked line (± 1/32").
   e. lock joints of tiles are correctly assembled (± 1/64" at joint).
   f. tiles are stapled against each furring strip.
   g. irregular shapes are cut from tiles using the coping or compass saw.

   Your performance will be evaluated in accordance with the instructor's checklist.

5. Cut and install hardwood flooring in a residential structure according to plans and specifications provided by the instructor. Standards for proper installation of hardwood flooring are given in Unit 15 of Modern Carpentry. Your work will be evaluated in accordance with the instructor's checklist.

OBJECTIVES (cont'd):

6. Cut and install under-layment boards for receiving tile or carpet in a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:
    a. joints are staggered with at least 1/32" space left between joints.
    b. grain of face plies runs at right angles to framing supports with end joints staggered.
    c. nailing should not exceed a field spacing of 10" and an edge spacing of 6" on center (± 1").
    d. boards are attached with ring grooved nails or cement coated sinker nails of appropriate size.

    Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

In order to finish this unit successfully you should complete the task packages in numerical order. Note the prerequisites carefully because many units are required prior to beginning this one. In the packages you will be asked to view sound-slide presentations, perform readings, answer questions, and complete other activities as required.

The task packages that are included in this unit are as follows:

TASK PACKAGE 1: INSULATION BATTS

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 2: SHEET ROCK

TASK PACKAGE 3: WOOD PANELS

TASK PACKAGE 4: CEILING TILE

TASK PACKAGE 5: HARDWOOD FLOORING

TASK PACKAGE 6: UNDERLAYMENT BOARD

If at this time you feel that you are able to pass a comprehensive examination over the material covered in this unit, contact your instructor for the administration of the test. However, if you determine that you are not yet ready to be examined, begin work on the packages as indicated previously.

UNIT XIII: INTERIOR WALLS, CEILING, AND FLOOR FINISH

TASK PACKAGE 1: INSULATION BATTS

PREREQUISITES: UNITS I-VII: UNITS IX-XII

RATIONALE:

Welcome to Unit XIII! This first task package is not batty, but it is concerned with batts. Not baseball bats, bats in the belfry, or any kind of bat you may already know. Therefore, come on in and meet a new type of batt.

Today's home owner demands a high level of comfort in his home from the winter's cold and the summer's heat. This need is partially met by the use of modern insulating materials. For heating and air conditioning systems to operate more successfully, the use of thermal insulation and vapor barriers is essential. The use of the proper insulation material results in a savings cost -- fuel will be saved in winter - and in summer the size of the air conditioning equipment can be reduced as well as the cost of operation. Insulation is commonly placed in the walls and ceiling but may be placed in the floors as well. Prior to the installing of the insulation all the "rough-in" work needs to be completed by the heating, electrical, and plumbing tradesmen because the insulation will cover this work when put in place. In this task package you will learn how to cut, install, and staple insulation into place. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut, install, and staple insulation batts and roll blanket insulation in a residential structure according to plans and specifications given by the instructor, maintaining the following standards:

a. batts are stapled in place between the ceiling joists with the vapor barrier facing downward.

b. batts should be wedged between the joists and placed end to end touching one another.

c. blanket insulation should be wedged between wall studs and be cut to fit against the top and bottom plate and stapled to the studs with the vapor barrier facing the inside of the room.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ________________, starring Batt Man.
2. Read pages 277-294 in Modern Carpentry. Study particularly those sections dealing with blanket and batt insulation and how to install these in the walls and ceiling.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Folding wood rule
2. Pencil
3. Knife
4. Tin snips
5. Stapler
6. Insulation batts
7. Blanket insulation

1. In consultation with the instructor and after studying the plans for the house, determine the type of insulation needed and where it is to be placed. NOTE - Probably roll (or blanket) insulation will be chosen for the walls and batt insulation for the ceilings.

2. The following items are included because they are necessary to know prior to actual installation.

   a. Blanket or batts can be cut with a fine-tooth crosscut saw, shears, tin snips, or a large knife.

   b. Measure the space into which the blanket or batt is to fit; then cut the insulation 2 to 3 inches longer.

   c. Remove a portion of the batt or blanket from each end so that you will have a flange of the backing for vapor barrier to staple to the framing.

   d. When installing insulation wear tight-fitting clothing and a cap with a wide brim. Insulation may be very irritating to the skin or the eyes.

LEARNING PRACTICE (cont'd):

  e. Always install the insulation with the paper side facing the inside of the room.

3. When installing insulation in walls of the house, the following procedure should be used:

  a. If blanket insulation is being used, mark the required length on the floor, unroll the blanket and align it with the marks, and cut the required number of pieces.

  b. Place one blanket between the studs in the wall and staple the top end to the plate and then staple down along the studs, aligning the blanket carefully. Secure the bottom of the blanket to the sole plate. NOTE - Since dry wall construction is to be used in your house the blanket should be stapled in place as illustrated in the "B" example of figure 13-35, page 290, in Modern Carpentry. Staples should be spaced no more than 6 inches apart.

  c. If batts are to be installed in a wall, follow the procedure outlined on page 290 in Modern Carpentry.

  d. Carefully work the insulation in behind drain pipes or electrical outlet boxes. See figure 13-36, page 291, in Modern Carpentry.

4. When installing insulation batts in the ceiling, the following procedure should be used:

LEARNING PRACTICE (cont'd):

a. Insulation batts are placed between the ceiling joists and are installed from below as shown in figure 13-37, page 291, in Modern Carpentry.

b. The batts should be butted snugly together at the ends and carried out over the outside wall plates. See figure 13-33, page 291, in Modern Carpentry.

c. If bridging is encountered in the installation of batts, follow the procedure shown in figure 13-39, page 291, in Modern Carpentry.

5. After the main large areas of walls and ceilings are complete, spaces above and below windows and around outside door frames should be insulated. See page 291 and figure 13-41 on page 292 in Modern Carpentry for this procedure.

6. When you are satisfied with your insulation of the walls and ceilings, contact the instructor for his evaluation.

7. Upon satisfactory completion of the insulation job, you will be directed to the next task package.

Whether it was batts or blankets, you were good at covering this assignment.

UNIT XIII: INTERIOR WALLS, CEILING, AND FLOOR FINISH

TASK PACKAGE 2: SHEET ROCK

PREREQUISITES: UNITS I-VII; UNITS IX-XII; UNIT XIII, TASK PACKAGE 1

RATIONALE:

Sheet rock does not mean a moon rock lying on a sheet. Sheet rock is a type of material for dry wall construction, as you will learn here.

After the blanket or batt insulation has been cut, installed, and stapled into place in the walls and ceilings, these interior parts of the house are now ready for an additional covering. Many types of materials are employed for this purpose; however, the two principle ones are plaster and dry wall construction. In dry wall construction large gypsum boards, commonly know as sheet rock, are carefully applied with the nail holes and joints being smoothly covered and finished so that the resulting surface resembles a plastered wall. In this task package you will learn how to cut and install sheet rock on the ceilings and walls according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install sheet rock in a residential structure according to plans and specifications supplied by the instructor maintaining the following standards:

a. when sheet rock is applied to the ceiling joists, the lengthwise joints of the sheets fall along the centers of the joists (± 1/16").

b. sheet rock is nailed properly on each joist (using appropriate nails and spacing them 6" apart [± 2"]).

c. joints between sheets should show no more than 1/8" between them.

d. when sheet rock is applied to the walls the sheets should be placed lengthwise beginning at ceiling level, nailed properly (using appropriate nails and spacing them 6" apart [± 2"] on all studs).

e. joints between sheets should show no more than 1/8" between them.

Your performance will be evaluated in accordance with the instructor's checklist.

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LEARNING ACTIVITY [illegible]:

1. View sound-slide package C-XIII-2, a hard sheet rock show.
2. Read pages 313-316 in Modern Carpentry, beginning with the section entitled Dry Wall Construction.
3. [illegible] Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

[illegible]

1. [illegible]
2. Sheet rock [illegible]
3. Crosscut saw
4. Knife
5. Straight edge
6. Layout tape
7. Folding wood rule
8. Linoleum knife
9. Supply of gypsum wall board (sheet rock)
10. Coping saw
11. Compass saw

1. Study the house plans to determine the thickness and size of the gypsum wall boards (sheet rock) to use in covering the interior walls and ceilings.
2. The following items should be considered prior to the installation of the sheet rock on the walls and ceilings:
   a. Studs and ceiling joists should be straight and true.
   b. Wood framing material should be kiln-dried to a moisture content very near to that which it will eventually attain in actual service.
   c. Sheet rock is available in a variety of thicknesses, edge joints, and types. See figure 14-18, page 313 in Modern Carpentry.

LEARNING PRACTICE (cont'd):

d. Standard wall board sizes include widths of 4 feet and lengths as long as 16 feet. The most common thicknesses are 3/8, 1/2, and 5/8 inches.

e. In single layer construction, the sheet rock is applied directly to the wood framework using a thickness of 1/2 or 5/8 inch. NOTE - In your house 1/2 inch thickness will be used.

f. In installing the sheet rock, the ceilings should be applied first and then the side walls.

g. Sheet rock should be applied to the ceiling joists with the joints being formed along the lengths of the joists. On the walls, the sheet rock should be applied at right angles to the studs.

3. The following steps should be used in the cutting and installation of the sheet rock on the ceilings and walls.

a. The sheet rock should be measured and cut as illustrated in figure 14-21, page 314, in Modern Carpentry and as described on page 314.

b. Irregular shapes and curves can be cut with a coping saw, compass saw, or electric jigsaw. See figure 14-22, page 314, in Modern Carpentry.

c. Apply the sheet rock to the ceiling joists with the lengthwise joint falling along the center of the joists. NOTE -

LEARNING PRACTICE (cont'd):

In general the sheet will be long enough to reach across the room and, thereby, eliminate end joints on the sheet rock. Joints should show no more than 1/8" between them.

d. Hold the sheet rock against the ceiling as pictured in figure 14-23, page 315, in Modern Carpentry while nailing into each joist, spacing the nails 6" apart. Read pages 314 - 315 for the exact procedure.

e. When installing sheet rock on the walls, begin at the ceiling level and run the sheet rock at right angles to the studs, nailing to each stud and spacing the nails 6" apart. NOTE - When joints occur they should show no more than 1/8" space.

f. Adhesives and screws may be used for attaching sheet rock to the walls and ceiling. See page 315, in Modern Carpentry for this procedure.

g. When covering the joints in the sheet rock and the nail heads, follow the procedure outlined on pages 315-316 in Modern Carpentry.

h. When covering interior and exterior corners, follow the procedure given on page 316 in Modern Carpentry.

4. When you feel that you have properly installed the sheet rock on the ceilings and walls and have checked your work against the Objective, seek the evaluation of the instructor.

LEARNING PRACTICE (cont'd):

5. Upon the satisfactory completion of the job, you will be directed to the next task package.

How can you fail with an attitude like yours? Keep progressing, learning, and smiling.

UNIT XIII: INTERIOR WALLS, CEILING, AND FLOOR FINISH

TASK PACKAGE 3: WOOD PANELS

PREREQUISITES: UNITS I-VII; UNITS IX-XII; UNIT XIII, TASK PACKAGES 1-2

RATIONALE:

In the last task package, you climbed the walls and hit the ceiling. This time it's back to the walls again - if you're putting plywood panel over the wall board. Learn about this process here.

In the previous assignment you installed gypsum wall board (sheet rock) on the ceilings and walls of the house. When painted this may serve as the final finish; however, in some cases a plywood panel is attached over the wall board and provides the finish for the walls. Wood panels may also be attached directly to the studs by nails or with special adhesives. Many surface textures are available for use and a variety of pleasing arrangements may be worked out in the installation process. In this task package you will learn how to cut and install wood panel sheets in your house according to plans and specifications. Continue by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install wood panel sheets in a residential structure according to plans and specifications provided by the instructor, maintaining the following standards:

a. panels run vertically from floor to ceiling with the edges falling on the center of the studs (± 1/16").

b. joints between sheets show no more than 1/32" between them, and colored matching nails spaced 6" apart (± 2") are used to attach panels to studs.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XIII-3, featuring Woody Panel.
2. Read pages 321-323 in Modern Carpentry, ending your reading with the section entitled Ceiling Tile.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Color matched nails
3. Plywood paneling
4. Portable electric circular saw
5. Folding wood rule
6. Straight edge
7. Wood paneling
8. Crosscut saw

1. Study the house plans and confer with the instructor to determine what type and size of wood paneling will be used. Note - the most common panel size is the 4' x 8' sheet, which you no doubt will use.
2. Whether plywood, hardboard, or prefabricated plastic laminate panels are used, the installation process will be the same as given below for the plywood panels.
3. Before making an installation of plywood, the panels should become conditioned to the temperature and humidity of the room. See page 321 in Modern Carpentry for additional information concerning this procedure.
4. Plan the layout carefully to minimize the amount of cutting and reduce the number of joints. See figure 14-40, page 322, in Modern Carpentry for several application designs. Note - You will use the vertical panel arrangement in your house.

LEARNING PRACTICE (cont'd):

5. Plywood 3/8" thick may be attached directly to the wall studs with nails or special adhesives. If walls are uneven, furring strips may be used. See page 321 in Modern Carpentry for this procedure.
6. In some cases 1/4" plywood is installed over a base layer of 1/2" gypsum wall board. Read about this procedure on page 321 in Modern Carpentry.
7. Prior to actual installation check the height between the subfloor and the ceiling. This should be 8 feet 1/2 inch high. When using a 4' x 8' sheet placed vertically, this will allow for 1/4" clearance at the top and the bottom.
8. Begin the installation of panels at a corner. Scribe and trim the edge of the first panel so it is plumb and the 8' edge is aligned with the center of a stud.
9. Nail this panel into place with colored matching nails spaced 6" apart. Nails should be driven into each stud and into the top and bottom plates.
10. Install additional panels in a similar manner, butting the vertical edges together on the stud centers.
11. Cut the paneling as needed to fit around openings.
12. After all panels are in place, molding is used to cover the 1/4" clearance space at the top edge along the ceiling, and base-

LEARNING PRACTICE (cont'd):

boards cover the 1/4" space at the floor line.

13. After you have checked your finished paneling job, contact the instructor for his evaluation.

14. Upon satisfactory completion of this job you will be directed to the next assignment.

Paneling certainly makes a difference in the appearance of a house. You might say paneling is beautiful, and so is the knowledge you gained in the process.

You're putting the right finish on all the carpentry skills you are attaining.

UNIT XIII: INTERIOR WALLS, CEILING, AND FLOOR FINISH

TASK PACKAGE 4: CEILING TILE

PREREQUISITES: UNITS I-VII; UNITS IX-XII; UNIT XIII, TASK PACKAGES 1-3

RATIONALE:

This is the task package in which you'll hit the ceiling. No, it doesn't mean that you'll get angry. You'll simply spend a little while with ceiling tile.

Often the home owner desires that his ceilings be covered with ceiling tile instead of being finished with sheetrock that has been painted or has been sprayed with acoustical plaster. In addition to being used in new construction, ceiling tile is equally adaptable for older structures. In either old or new structures, ceiling tile can be installed over furring strips, solid plaster, plaster board or any smooth, continuous surface. Ceiling tile may be made from a variety of materials which possess many and varied properties such as light reflection, fire resistance, sound absorption, and others. The standard size tile is 12 x 12 inches; however, the tiles are available in larger sizes. They may range considerably in surface patterns and textures and are equipped with a unique type of overlapping, tongue and groove edge which permits efficient installation. In this task package you will learn how to cut and install furring strips and ceiling tile according to plans and

RATIONALE (cont'd):

specifications. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install furring strips and ceiling tile in a residential structure according to plans and specifications provided by the instructor maintaining the following standards:

a. furring strips are cut to proper length (± 1/8") and are spaced 12" o.c. (± 1/16").

b. furring strips are leveled with tapered shims (± 1/16") and nailed on each ceiling joist.

c. strips are located closer along wall to accommodate narrower width of border tile.

d. border tile are installed along a chalked line (± 1/32").

e. lock joints of tiles are correctly assembled (± 1/64" at joint).

f. tiles are stapled against each furring strip.

g. irregular shapes are cut from tiles using the coping or compass saw.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ________________, entitled "Ceiling Zero."
2. Read and study carefully pages 323-327, in Modern Carpentry, beginning with the section entitled Ceiling Tile and ending with Suspended Ceilings.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d nails
3. 1 x 3 inch furring strips
4. Chalk line & chalk
5. Folding wood rule
6. Pencil
7. Combination square
8. Carpenter's level
9. 12" x 12" ceiling tile
10. Wooden wedges
11. Stapler & staples
12. Knife
13. Coping saw
14. Compass saw

1. Check the plans of the house and discuss ceiling installation with the instructor to determine what type of ceiling tile will be used and the method of application.
2. The method of application generally used is that of installing furring stips onto which 12" x 12" ceiling tiles are attached by use of a stapler. The remainder of the Learning Practice will be devoted to explaining this type of application procedure.

LEARNING PRACTICE (cont'd):

3. The following items should be considered in the layout procedure:
   a. Measure the two short walls and locate the midpoint of each one; then snap a chalk line to establish the center line. See figure 14-47, page 325, in Modern Carpentry.
   b. Snap another chalk line in the middle of the first one and at right angles to it.
   c. All tiles are to be installed with their edges parallel to these lines.
   d. For a symmetrical appearance, the border courses along opposite walls should be equal. See page 324, in Modern Carpentry, for the procedure in doing this.
4. In installing the furring strips the following steps should be observed:
   a. The 1 x 3 inch furring strips should be attached to the ceiling joists using two 8d nails at each joist.
   b. The first furring strip should be located against the wall at right angles to the joists and nailed with 8d nails. See figure 14-48, page 325, in Modern Carpentry.
   c. Placement of the second furring strip will depend upon the width of the border tile (see 3d in the Learning Practice for this width). Nail this strip in place so that it is centered over the edge of the border, using the line previously laid out.

LEARNING PRACTICE (cont'd):

d. Install all other furring strips 12 inches o. c. using a spacer jig. See figures 14-49 and 14-50, page 325, in Modern Carpentry.

e. The lower face of all furring strips should be level with each other. Tapered shims are often used to accomplish this. Refer to pages 324 and 325, in Modern Carpentry for illustrations of this procedure.

5. The following steps should be followed when installing ceiling tile:

a. Snap chalk lines on the furring strips as a guide for setting the border tile. This is to be done along each wall.

b. Cut the border tile as illustrated on page 326 and in figure 14-53 in Modern Carpentry.

c. Irregular cuts to fit around light fixtures or other projections may be made with a coping saw or compass saw. See figure 14-53, page 326, in Modern Carpentry.

d. Begin installation with a corner tile and then set border tile out in each direction. Use three staples along each flanged edge. See figure 14-46, page 324, and figure 14-54, page 326, in Modern Carpentry.

e. Install full size tile until you reach the opposite wall, stapling as shown in figure 14-54, page 326, in Modern Carpentry.

LEARNING PRACTICE (cont'd):

NOTE - Use 9/16" long staples, three in each flange.

f. When you reach the opposite wall, the border tile will have the stapling flanges removed, and should be faced nailed. See page 326, in Modern Carpentry.

6. When you have checked your ceiling installation carefully against the Objective and believe it has been done correctly, ask the instructor for his evaluation.

7. Upon satisfactory completion of the assignment you will be directed to the next task package.

A carpenter must know how to do a variety of things, as you have discovered. When you think about it you have acquired many of these competencies. Congratulations!
In the future, your career in carpentry should peak at a high ceiling.

UNIT XIII: INTERIOR WALLS, CEILING, AND FLOOR FINISH

TASK PACKAGE 5: HARDWOOD FLOORING

PREREQUISITES: UNITS I-VII; UNITS IX-XII; UNIT XIII, TASK PACKAGES 1-4

RATIONALE:

This is not a hard task package, but a hardwood task package. You shouldn't let it floor you, though. So step right up and learn about hardwood flooring.

There are many home owners that prefer to have hardwood flooring installed in many areas within their home. Hardwood flooring is available as strip flooring in a variety of widths and thicknesses, and as random width planks or unit blocks. Hardwood flooring has the strength and durability to withstand wear and also provides a highly attractive appearance. Oak flooring is probably the most widely used; however, maple, birch, beech and other hardwoods are also used. For a durable, luxurious-looking floor, hardwood is selected. Although not used now as often as in previous years, the carpenter must still know how to install hardwood flooring. Therefore, in this task package you will learn how to cut and install hardwood flooring in a residential structure according to plans and specifications. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install hardwood flooring in a residential structure according to plans and specifications provided by the instructor. Standards for proper installation of hardwood flooring are given in Unit 15 of Modern Carpentry. Your work will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View slide-sound package ________________, starring the Hardwood boys.
2. Read pages 331-336 in Modern Carpentry, ending with the section entitled Estimating.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Appropriate length finish nails
3. Crosscut saw
4. Combination square
5. Pencil
6. Portable electric circular saw
7. Nail set
8. Hardwood flooring
9. Chalk line & chalk

LEARNING PRACTICE (cont'd):

1. Consult the house plans and discuss with the instructor to determine the type, size, and the amount of hardwood flooring that is to be installed.
2. The following items should be considered before actual installation begins:
    a. Check over the subfloor to assure yourself that it is clean and the nailing patterns are complete.
    b. Upon the subfloor, lay a good quality of building paper according to the procedure covered on page 333 in Modern Carpentry and shown in figure 15-4.
    c. Chalk line the building paper indicating the location of the joists.
    d. Where the floor areas are located directly over the heating ducts, follow the procedure outlined on page 333 in Modern Carpentry.
    e. Strip flooring (which you will use) should be laid at right angles to the floor joists. See page 333 in Modern Carpentry for additional explanation on this point.
    f. To eliminate squeeks or creaks, the hardwood floor must be properly nailed with an adequate number and proper size of nails extending through the subfloor and into the joists. Refer to pages 333-334 in Modern Carpentry. See figure 15-5,

LEARNING PRACTICE (cont'd):

page 333, in Modern Carpentry for a chart showing various sizes of nails for different types of floors.

3. When installing hardwood flooring, use the following procedure:
   a. Start the installation in a single room by laying the first strip along either side wall, placing the strip no closer than 1/2 inch of the wall. See page 334 in Modern Carpentry, for additional details.
   b. When the first strip is aligned, face nail it in place as illustrated in figure 15-6, page 334, in Modern Carpentry, and described in the text on page 334.
   c. Succeeding strips are blind nailed with the nail penetrating the flooring where the tongue joins the shoulder, with each strip fitting tightly against the preceding strip. See figures 15-6 and 15-7, page 334, in Modern Carpentry.
   d. Cut and fit a number of pieces and lay them ahead of the installed strips. Follow the procedure outlined on page 334 in Modern Carpentry. NOTE - Do not permit end joints in successive courses to come closer than 6 inches to each other.
   e. If you must lay hardwood flooring around projections or in several rooms, follow the procedure outlined on pages 334-336 in Modern Carpentry.

LEARNING PRACTICE (cont'd):

4. When you feel that you have properly installed the hardwood flooring, contact the instructor for his evaluation.
5. Upon satisfactory completion of this assignment, you will be directed to the next task package.

As far as hardwood flooring is concerned, no one puts it down like you put it down.

Would you believe it? This hardwood package wouldn't floor you!

UNIT XIII: INTERIOR WALLS, CEILING, AND FLOOR FINISH

TASK PACKAGE 6: UNDERLAYMENT BOARD

PREREQUISITES: UNITS I-VII; UNITS IX-XII; UNIT XIII, TASK PACKAGES 1-5

RATIONALE:

If the home owner desires that carpet or tile be installed in his home, it is necessary for the carpenter to first install underlayment boards or hard board over the subfloor. Underlayment boards provide a smooth surface which prevents the finish flooring material from checking or cracking when slight movements take place in a wood subfloor due to moisture and temperature changes. The underlayment is usually installed as soon as the ceiling and wall surfaces are complete and at about the same time unfinished hardwood flooring is laid. In this task package you will learn how to cut and install underlayment boards for receiving tile or carpet, according to plans and specifications. Continue now by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install underlayment boards for receiving tile or carpet in a residential structure according to plans and specifications supplied by the instructor maintaining the following standards:

a. joints are staggered with at least 1/32" space left between joints.

b. grain of face plys runs at right angles to framing supports with end joints staggered.

c. nailing should not exceed a field spacing of 10" and an edge spacing of 6" on center (± 1").

d. boards are attached with ring grooved nails or cement coated sinker nails of appropriate size.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View slide-sound package ______________, entitled "20,000 Leagues Under the Board."

2. Read and study pages 339-341, in Modern Carpentry, beginning your reading with the section entitled Underlayment and ending with Installing Resilient Floor Tile.

LEARNING ACTIVITY (cont'd):

3. This completes your Learning Activity; begin, now, with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Nails of the appropriate size and kind
3. Folding wood rule
4. Hardboard underlayment
5. Plywood underlayment
6. Portable electric circular saw
7. Framing square
8. Pencil

1. Study and discuss the plans with the instructor, so that you may determine which rooms will receive underlayment boards; what thickness, width, and length they will be; and whether they will be hardboard or plywood.
2. The following description will concern 5/8" hardboard installation with any application differences in plywood being noted later.
3. To begin the installation, start on one corner of the room and fasten each panel securely before nailing the next. See the installation and nailing pattern in figure 15-16, page 340, in Modern Carpentry.
4. Allow at least 1/8" space along an edge next to a wall or any other vertical surface.

LEARNING PRACTICE (cont'd):

5. Joints of the underlayment boards should be staggered and fitted together accurately with a 1/32" space at each joint. Refer to page 340 in Modern Carpentry for a description of this process. Also study figure 15-17 for an illustration of joints being staggered.

6. Underlayment boards should be attached to the subfloor with approved fasteners (ring grooved nails or cement coated sinker nails). See figure 15-18, page 340, in Modern Carpentry. The spacing of the nails and the driving procedure should follow that recommended on page 340 in Modern Carpentry.

7. If plywood is used as the underlayment, spacing between the panel joints is not critical, and the same general installation procedures may be followed as was used with the hardboard.

8. Turn the grain of the face plys to run at a right angle to the framing supports and stagger end joints. Follow the nailing patterns and use the type of nails as outlined on page 340 in Modern Carpentry.

9. Check your finished underlayment installation and, when satisfied, seek the evaluation of the instructor.

10. Upon satisfactory completion of the finished job you will be directed to the next unit.

Underlayment board may be a hard board, but this task package was not hard enough to lay you under.

Your underlying knowledge of carpentry will help you earn more bread.

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: CARPENTRY
COURSE: CARPENTRY

UNIT PACKAGE XIV: DOOR AND INTERIOR TRIM

PREREQUISITES: UNITS I-VII; UNITS IX-XIII

RATIONALE:

Thus far, on your house, you have completed many and varied carpentry tasks. Most recently the walls, ceiling, and floors have been installed. By comparison with what has already been completed, there remains only a small number of jobs to be finished in order to complete the house. The work that remains consists of cutting and installing molding and trim, installing door jambs, doors and locks, and, finally, the application of the threshold. You most certainly will want to complete these last few jobs with the same enthusiasm that has marked your work up to this time. Therefore, proceed by reading the General Objective for the unit and the Specific Objective for each task package. You are to then read the Learning Activity which will reveal to you what you are to do and how to proceed in the completion of this unit.

OBJECTIVE:

GENERAL:

Upon completion of this unit you will be able to cut and install interior trim, doors, and door hardware.

OBJECTIVE (cont'd):

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Cut and install crown molding in a residential structure according to plans and specifications provided by the instructor, maintaining the following standards:
    a. molding is cut to the correct length (± 1/16").
    b. installed against wall and ceiling, and attached with appropriate finish nails.
    c. inside corners to be coped allowing no more than a 1/32" space showing at joints.
    d. outside corners are mitered with no more than 1/32" at the joint.

    Your performance will be evaluated in accordance with the instructor's checklist.

2. Cut and install interior door jambs (or frame) in a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards.
    a. jamb is centered (± 1/16") in the rough opening.
    b. head jamb is level (± 1/32").
    c. side jambs are plumb (± 1/32").
    d. wedges are placed and secured between rough frame and door frame at hinge-seat and lock striking plate locations.

OBJECTIVE (cont'd):

e. distance between head jambs and rough floor is the same (± 1/16").

f. frame nailed in place using 8d finish nails measuring in on the side door jambs the door thickness plus 7/8".

Your performance will be evaluated in accordance with the instructor's checklist.

3. Cut and install door trim (or casing) and a door stop in residential structure according to plans and specifications provided by the instructor, maintaining the following standards:

a. casing is the correct length (± 1/16").

b. miter joints fit together showing no more than a 1/32" space.

c. bottom end of side casings is square and rests lightly on the finished floor.

d. side casings and top casings are installed in place with 6d and 8d finish nails placed in pairs 16" o.c. (± 2").

e. door stop should be installed with a 1/16" clearance between the hinge jamb of the door and the stop with the door in a closed position.

f. stop on the lockside of the door is set tight against the door.

g. stop on head jamb should line up with stops on side jambs.

h. joints of the door stops are mitered and attached with 4d nails spaced 16" o.c. (± 2").

Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

4. Hang interior doors and install locks in a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:
   a. door fits the shape of the door opening and has a clearance of 1/16" (± 1/32") on each side and top with the bottom (± 1/8") above the level of the finished floor.
   b. hinges are properly positioned in opening (top hinge 5"-7" below head jamb, bottom hinge 10"-12" above door bottom; if middle hinge is necessary center midway between top and bottom hinges [± 1/8"]).
   c. hinge gains in door jamb are properly cut to accommodate hinges (door gain set back 1/4" from face of door; depth of gains allows hinges to set flush; gains are square and cleanly cut).
   d. hinges are properly screwed into door and jamb.
   e. door lock and striking plate are properly installed; door stops are correctly installed (hinge jamb stop has 1/16" clearance; lock stop is flush with outside edge of jamb).
   f. door opens and closes smoothly.

   Your performance will be evaluated in accordance with the instructor's checklist.
5. Install sliding or bi-fold doors in a residential structure according to plans and specifications provided by the instructor; in addition, the

OBJECTIVE (cont'd):

specific door manufacturer's specifications and Unit 17 in Modern Carpentry will serve as standards for installation. Your finished job will be evaluated by your instructor using these standards as a checklist.

6. Cut and install window trim in a residential structure according to plans and specifications supplied by your instructor, using pages 378-379 in Modern Carpentry as a standard. Your work will be evaluated in accordance with the instructor's checklist.

7. Cut and install baseboard and shoe molding in a residential structure according to plans and specifications provided by the instructor, maintaining the following standards:
   a. baseboard fits flush against the finished floor and wall, and is cut to the correct length (± 1/16").
   b. inside corner joints are coped, showing no more than a 1/32" space.
   c. outside corner joints are mitered with no more than a 1/32" opening showing.
   d. molding is attached to studs and sole plate, using appropriate finish nails.
   e. shoe molding fits flush against the baseboard and floor, and is cut to the correct length (± 1/16").
   f. inside corner joints of the shoe molding are coped, showing no more than a 1/32" space.

OBJECTIVE (cont'd):

g. outside corner joints are mitered with no more than a 1/32" opening showing.

h. shoe is attached to the baseboard and subfloor with the appropriate finish nails.

Your performance will be evaluated in accordance with the instructor's checklist.

8. Cut and install metal threshold in a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

a. threshold is cut and notched to fit the door opening with no more than a 1/32" clearance showing.

b. when properly installed, the threshold will allow the door to open and close easily.

c. threshold manufacturer's detailed instructions are followed.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

In order to complete this unit successfully, you should complete the task packages in numerical order. As you will note, there are many units which are the prerequisites to this one. In doing the work required in the packages, you will be asked to view sound-slide packages, perform

LEARNING ACTIVITY (cont'd):

readings, and complete other activities as required. The task packages that are included in this unit are:

TASK PACKAGE 1: CROWN MOLDING

TASK PACKAGE 2: DOOR JAMBS

TASK PACKAGE 3: DOOR TRIM

TASK PACKAGE 4: INTERIOR DOORS AND LOCKS

TASK PACKAGE 5: SLIDING OR BI-FOLD DOORS

TASK PACKAGE 6: DOOR AND INTERIOR TRIM

TASK PACKAGE 7: BASEBOARD AND SHOE MOLDING

TASK PACKAGE 8: METAL THRESHOLD

After reading the unit thus far, if you feel that you can pass a comprehensive examination, contact the instructor for the administration of this test. However, should you feel unable to pass the exam at this time, you may begin work on the task packages as previously indicated.

UNIT XIV: DOOR AND INTERIOR TRIM

TASK PACKAGE 1: CROWN MOLDING

PREREQUISITES: UNITS I-VII; UNITS IX-XIII

RATIONALE:

Welcome to Unit XIV! In this task package you may crown yourself for your progress thus far, and then mold new carpentry skills for yourself.

After the finished wall and ceiling have been installed, a trim molding is generally applied to the area where the wall and ceiling junction. The type of molding usually applied to this area is called crown molding and serves two major purposes; one, to cover up the space between the wall and ceiling; and, two, to serve as a transition from the vertical to the horizontal and also add beauty to the finished room. To install this molding requires a high degree of craftsmanship because the accuracy with which mating parts fit together can greatly enhance or detract from the final appearance of the trim. We have confidence in you, so let's learn how to cut and install crown molding by first reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install crown molding in a residential structure according to plans and specifications provided by the instructor maintaining the following standards:

a. molding is cut to the correct length (± 1/16").

b. installed against wall and ceiling, and attached with appropriate finish nails.

c. inside corners to be coped allowing no more than a 1/32" space showing at joints.

d. outside corners are mitered with no more than 1/32" at the joint.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XIV-1, a real crowning achievement.
2. Read pages 361-362 in Modern Carpentry. Study figure 17-1, page 361. The piece of molding fourth from the left is crown molding.
3. Read section entitled Miscellaneous Trim Members, pages 292-294, in Fundamentals of Carpentry, Volume II. NOTE - The cornice or

LEARNING ACTIVITY (cont'd):

cove mold pictured here is also known as crown mold.

4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

I. Tools and Equipment

1. Hammer
2. Finishing nails
3. Nail set
4. Miter box saw or
5. Electric miter box
6. Coping saw
7. Combination square
8. Pencil
9. Folding wood rule
10. Crown molding
11. Layout tape rule

1. Study the plans to determine which rooms are to have crown molding installed and what size molding is to be used.
2. Begin by measuring the length of one wall next to the ceiling and cutting a piece of crown molding to this length. (Cut both ends square.)
3. Nail this piece of molding into place with the appropriate size finish nails, setting the heads with a nail set.
4. On another piece of crown molding cut a 45° angle on the end revealing the molding's contour. Cope this contour to fit into the corner and against the first piece of molding installed. (If uncertain how to cope a joint, refer back to Task Package 7 in Unit I.)

LEARNING PRACTICE (cont'd):

5. Measure, layout, and cut this second piece of molding to length, squaring the second end. Nail it into place as was done on the first piece.
6. Cope the joint on the third piece of crown molding to fit into the corner and against the second piece. Cut the other end square and to length. Nail this piece of molding into place.
7. Measure, cut, and fit the remaining piece of molding into place and then nail as before.
8. If there is an exterior corner in the room, cut a miter joint (45° outside angle) on the crown molding and install it as has been done with the other crown molding.
9. If other rooms require crown molding, install it following the same procedure.
10. Compare your finished work with the Objective and, when you are satisfied with the result, contact your instructor for his evaluation.
11. Upon satisfactory completion of the job you will be directed to proceed to the next assignment.

You've done many fine jobs in this course, but this is probably your crowning achievement.

UNIT XIV: DOOR AND INTERIOR TRIM

TASK PACKAGE 2: DOOR JAMBS

PREREQUISITES: UNITS I-VII; UNITS IX-XIII; UNIT XIV, TASK PACKAGE 1

RATIONALE:

Don't get jammed up here! Unjam yourself and concentrate on the installation of door jambs.

The interior door frame (or door jambs) is the part of the interior doorway which forms the lining of the opening and covers the edges of the partition. The interior door frame is similar to the exterior door frame in that it has a head jamb and two side jambs, but it has no sill and the jambs are not rabbeted as with the outside frame. The interior door jambs are usually made of one inch material, 5 3/8" wide, with the head jamb dadoed into the side jambs. The interior door jambs usually arrive on the job cut, sanded, and fitted in the millwork plants. This allows for quick and easy assembly on the job. In this assignment you will learn how to install interior door jambs into place according to plans and specifications. On your mark, get set, install the door jambs by first reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install interior door jambs (or frame) in a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

a. jamb is centered (± 1/16") in the rough opening.

b. head jamb is level (± 1/32").

c. side jambs are plumb (± 1/32").

d. wedges are placed and secured between rough frame and door frame at hinge-seat and lock striking plate locations.

e. distance between head jambs and rough floor is the same (± 1/16").

f. frame nailed in place using 8d finish nails measuring in on the side door jambs the door thickness plus 7/8".

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package ____________, a jam-up production.
2. Read and study pages 361-363 in Modern Carpentry, ending your reading with the section entitled Door Casing.

LEARNING ACTIVITY (cont'd):

3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 8d casing or finish nails
3. Carpenter's level
4. Door jambs
5. Wedges
6. Folding wood rule
7. Pencil
8. Combination square
9. Crosscut saw

1. Check the plans of the house and determine what type and size of interior door jambs are to be installed.
2. Select one door opening on which to start and check the length of the head jamb and the side jambs to determine if they are correct for the rough opening.
3. Nail the jambs together using 8d casing or finish nails and, if necessary, cut the jambs to fit the rough opening.
4. Insert the frame in the opening with side jambs resting on the finished flooring, and level the head jamb as outlined on page 362 in Modern Carpentry.
5. Insert a spreader between the side jambs at the floor level as shown in figure 17-4, page 363, in Modern Carpentry.
6. Scribe a line on each side jamb as described on page 362 in

LEARNING PRACTICE (cont'd):

Modern Carpentry. This line will be used in locating nails and will later be covered up by the door stop.

7. Center the frame in the opening using wedges, plumb the side jambs with the carpenter's level, and nail the side jambs in place using 8d casing nails. See page 363 and figure 17-5 in Modern Carpentry for this procedure.
8. Complete the blocking by placing additional wedges behind the side jambs as described on page 363 and shown on figure 17-4 in Modern Carpentry.
9. When the door jambs are level, plumb and centered in the rough opening, nail the jambs in place through the blocking into the studs. See page 363 in Modern Carpentry for the exact procedure for doing this.
10. The procedure used for installing one interior door jamb may be used on all interior door jambs.
11. After you have compared your finished work against the Objective, contact the instructor for his evaluation.
12. Upon satisfactory completion of the job you will be directed to the next task package.

Glad you didn't get stuck in the door jambs; move on to additional skills in the carpentry trade.

You're doing a jam-up good job!

UNIT XIV: DOOR AND INTERIOR TRIM

TASK PACKAGE 3: DOOR TRIM

PREREQUISITES: UNITS I-VII; UNITS IX-XIII; UNIT XIV, TASK PACKAGES 1-2

RATIONALE:

Here is a case in which you will have to stop - stop doors, that is. For doors have to have stops and casings. Concentrate on them in this package.

After the inside door jambs have been installed into place, the next step is to apply the door casings to each side and at the top of the jamb, on both sides of the door. These casings cover the space between the jambs and the wall surface, and also serve to secure the door frame to the wall structure, making it rigid enough so it will carry the door. Also a part of the door trim is the door stop. This consists of three pieces of wood attached to the inside of the top and the two side jambs, and serves as a brace against which the door fits. Not only do the casings and the door stop serve practical purposes; they also serve to add beauty to the finished structure. In this task package you will learn how to cut and install casings and a door stop according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install door trim (or casing) and a door stop in a residential structure according to plans and specifications provided by the instructor, maintaining the following standards:

a. casing is the correct length (± 1/16").
b. miter joints fit together showing no more than a 1/32" space.
c. bottom end of side casings is square and rests tightly on the finished floor.
d. side casings and top casings are installed in place with 6d and 8d finish nails placed in pairs 16" o.c. (± 2")
e. door stop should be installed with a 1/16" clearance between the hinge jamb of the door and the stop with the door in a closed position.
f. stop on the lockside of the door is set tight against the door.
g. stop on head jamb should line up with stops on side jambs.
h. joints of the door stops are mitered and attached with 4d nails spaced 16" o.c. ± 2".

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XIV-3, a door trim show, co-starring "Door Casing" and "Door Stop."
2. Read pages 363-364 in Modern Carpentry, beginning with section entitled Door Casing and ending with Panel Doors.
3. On page 370 in Modern Carpentry, read the section entitled Door Stops.
4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. 4d, 6d, 8d, finish nails
3. Nail set
4. Combination square
5. Pencil
6. Folding wood rule
7. Electric miter box
8. Casing material
9. Door-stop material
10. Crosscut saw

1. Study the plans and discuss with your instructor to determine the type and kind of casing and door-stop material to be installed on the inside door jambs.
2. The following steps should be followed when installing the inside door casing upon a selected door frame:
   a. Gauge a light pencil line on the edge of the jambs 1/4" back from the face.

LEARNING PRACTICE (cont'd):

b. Make sure that the bottom of the side casing is square and will fit tightly against the finished floor.

c. With the side pieces of casing held in place, mark the position of the miter joint at the top end. Cut the miters with the electric miter box.

d. Nail the side casings temporarily in place, lining the edge against the line drawn in a above. Mark, cut, and fit the head casing in place. See page 364 and figure 17-8 in Modern Carpentry for an explanation of this procedure.

e. Finally attach the head and side casings permanently in place using the proper size nails, spacing, and nailing patterns as outlined on page 364 in Modern Carpentry.

f. The above procedure may be used in installing the casings on any inside door frame.

3. The following procedure will be used when installing the door stops on inside door jambs:

a. Knowing the thickness of the door to be hung in the door frame will indicate the location of the door stop.

b. Considering the door in the closed position, locate the stop on the hinge jamb with a clearance of 1/16".

c. The stop on the lock side of the door is set tight against the door.

LEARNING PRACTICE (cont'd):

d. The head jamb door stop is lined up with the stops on the side jambs.

e. Joints between the side jamb and head jamb door stops should be mitered and attached with 4d nails spaced 16" o.c. See figures 17-25 and 17-26 on pages 370 and 371 in Modern Carpentry.

f. All door stops on inside door frames are installed the same as outlined above.

4. After you have compared your casing and door stop installation with the Objective and have met the standards, seek the evaluation of the instructor.

5. Upon satisfactory completion of these jobs you will be directed to the next task package.

You were good at casing the house; don't stop now, because in the next assignment you will get to hold-up the door with hinges and make it safe by installing locks.

It's just a simple case of your not stopping in the attainment of your carpentry skills.

UNIT XIV: DOOR AND INTERIOR TRIM

TASK PACKAGE 4: INTERIOR DOORS AND LOCKS

PREREQUISITES: UNITS I-VII; UNITS IX-XIII; UNIT XIV, TASK PACKAGES 1-3

RATIONALE:

You're about to enter the inner sanctum. Be sure those doors you will hang are not squeaky, and keep the locks oiled. We must have silence in the inner sanctum.

After having installed the interior door jambs and set the casings and door stops in place, the next step is to hang the interior doors and install locks. The procedure in accomplishing these jobs is very similar to that followed in hanging the exterior doors and installing the entrance lockset. A properly hung door and installed lock lends much to the total appearance of the finished home. These jobs require considerable skill, but you have mastered these techniques already. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to hang interior doors and install locks in a residential structure according to plans and specifications supplied by the instructor, maintaining the following standards:

a. door fits the shape of the door opening and has a clearance of 1/16" (± 1/32") on each side and top with the bottom (± 1/8") above the level of the finished floor.

b. hinges are properly positioned in opening (top hinge 5"-7" below head jamb, bottom hinge 10"-11" above door bottom; if middle hinge is necessary, center midway between top and bottom hinges [± 1/8"]).

c. hinge gains in door jamb are properly cut to accommodate hinges (door gain set back 1/4" from face of door; depth of gains allows hinges to set flush; gains are square and cleanly cut).

d. hinges are properly screwed into door and jamb.

e. door lock and striking plate are properly installed; door stops are correctly installed (hinge jamb stop has 1/16" clearance; lock stop is flush with outside edge of jamb).

f. door opens and closes smoothly.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XIV-4; this show will keep you hanging on the edge of your seat.
2. Read pages [illegible] in Modern Carpentry, beginning with the section entitled [illegible] Doors and ending with Thresholds and Door Bottoms.
3. This concludes your Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Nails
3. Chisels
4. Screws & butt hinges
5. Screw driver
6. Jack plane
7. Folding wood rule
8. Pencil
9. Combination square
10. Electric plane
11. Electric router
12. Brace
13. Expansive bit

1. Study the plans and determine the type and size of the interior doors that are to be hung in the house and the type of locks needed for these doors.
2. The following items are general information that needs consideration before an inside door is actually hung:

LEARNING PRACTICE (cont'd):

a. Determine the type of door to be hung and the direction in which it will swing.

b. Trim the inside door to fit the door frame. Allow a clearance of 1/16" on each side and top and a 1/8" space at the bottom above the finished floor. See figures 17-17 and 17-18, page 368, in Modern Carpentry.

c. Plane a bevel on the lock edge of the door to provide clearance for the edge when it swings open. See page 369 in Modern Carpentry.

3. The following steps should be followed when hanging the door using butt hinges:

   a. Gains for hinges may be cut with an electric router using a door and jamb template. Refer to pages 369-370 in Modern Carpentry for this procedure.

   b. Gains may also be cut using a chisel and following the procedure outlined on the sheet attached to this task package.

   c. Cut out for the top hinge 5" - 7" below head jamb, for the bottom hinge 10" - 11" above door bottom, and for the middle hinge (if needed) halfway between the top and bottom hinge.

   d. Insert the hinges into the gains with the loose pin of the hinge toward the top of the door when the door is in the operating position.

LEARNING PRACTICE (cont'd):

e. Screw the hinges into place following the procedure [illegible] on page 369 in Modern Carpentry.

f. Attach the free leaf of the hinge to the jamb. [illegible] procedure outlined on page 369 in Modern Carpentry.

g. When all hinges have been installed, hang the door [illegible] place, check the clearance on all edges, and [illegible] corrections as covered on page 369 in Modern Carpentry.

h. Make sure the door stop (installed in prehung [illegible] unit) is properly in position and nailed in place.

i. The hanging of all inside doors may follow the same [illegible] procedure as covered in this assignment.

4. The following steps should be followed when installing [illegible] cal lock sets (one should also check the manufacturer's [illegible] instructions carefully):

a. Open the door to a convenient position and block [illegible] wedges placed underneath.

b. Using the template provided by the manufacturer, [illegible] for the lock at the proper height on the door. See figure 17-17, page 368, in Modern Carpentry for the height and refer to figure 17-30, step 1, page 372, for the layout procedure.

LEARNING PRACTICE (cont'd):

c. Install the latch unit by boring the proper size [illegible] cut out for the latch front. Refer to figure 17-[illegible], [illegible] 1 and 2, page 372, in Modern Carpentry.

d. Install strikeplate following the procedure shown in [illegible] figure 17-30, page 373, in Modern Carpentry.

e. Adjust and install the lock according to the [illegible] outlined in figure 17-[illegible] in Modern Carpentry.

5. Check your finished door hanging and lock installation [illegible] terms of the Objective. When you are satisfied, report [illegible] instructor for his evaluation.

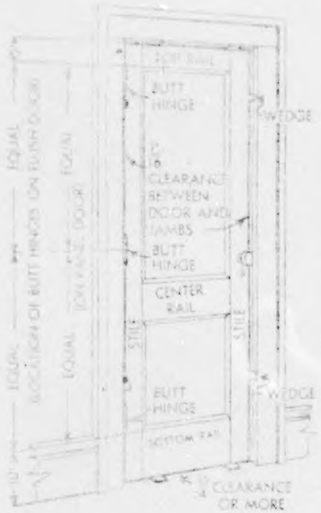
6. After satisfactory completion of the finished job you will be directed to the next assignment.

The teacher will never catch you hanging around; you almost have this course locked up. Keep up the good work - you're [illegible] your way to becoming a competent carpenter.

HOW TO USE

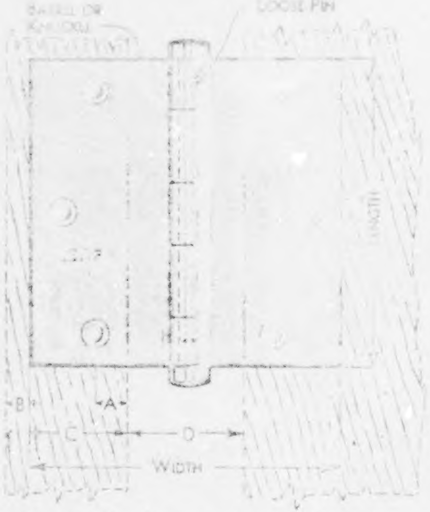
THE STANLEY BUTT GAUGE

AND HOW TO HANG A DOOR WITH STANLEY BUTT HINGES


EQUAL
LOCATION OF BUTT HINGES ON FLUSH DOOR
EQUAL
EQUAL
ON PANEL DOOR
EQUAL
TOP RAIL
BUTT HINGE
1/16" CLEARANCE BETWEEN DOOR AND JAMBS
BUTT HINGE
CENTER RAIL
STILE
STILE
BUTT HINGE
BOTTOM RAIL
WEDGE
WEDGE
10"
1/4" CLEARANCE OR MORE

LOOSE PIN BUTT HINGE SPECIFICATIONS FOR WOOD DOORS

[illegible] BUTT HINGES ONE FOR EACH 2½ FT OF HEIGHT	
SIZE AND TYPE OF DOOR	SIZE OF BUTT HINGE
¾" ⅞" STANDARD DOORS UP TO 24" WIDE	2½"
⅞" TO 1⅛" [illegible] DOORS UP TO 36"	[illegible]
1⅛" [illegible] DOORS [illegible]	3½"
[illegible]	4"
1⅜" 1¾" [illegible]	4½"
[illegible]	5"
[illegible]	5½" HEAVY
[illegible]	6" HEAVY
[illegible]	[illegible] HEAVY
[illegible]	[illegible] HEAVY

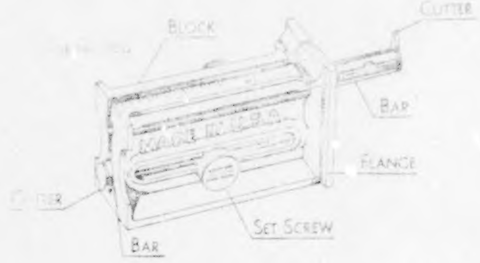

BARREL OR KNUCKLE
LOOSE PIN
LENGTH
B
A
C
D
WIDTH

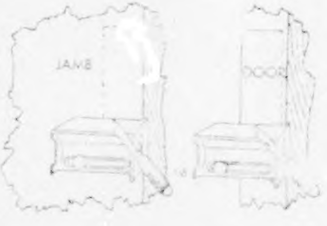
A. KEEP THIS DISTANCE SUFFICIENT TO PREVENT SPLITTING

B. SET BACK ENOUGH TO PREVENT SPLITTING WHEN CHISELING

C. WIDTH OF THE GAIN

D. MAXIMUM CLEARANCE WHEN DOOR IS OPEN

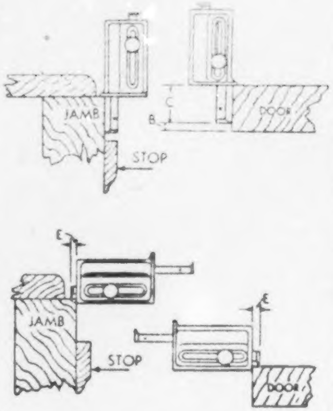

BLOCK
CUTTER
BAR
FLANGE
CUTTER
BAR
SET SCREW
MADE IN U.S.A.

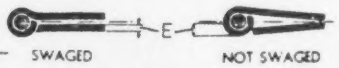


TO SQUARE LINES FOR THE LENGTH OF THE GAIN HOLD THE FLANGE OF THE BUTT GAUGE AGAINST THE SIDE OF THE DOOR, OR THE JAMB AND USE IT LIKE A TRY SQUARE AS SHOWN IN THE ILLUSTRATION.

TO GAUGE THE WIDTH OF THE GAIN ADJUST THE GAUGE AS SHOWN FOR THE DIMENSION C. THIS IS THE THICKNESS OF THE DOOR LESS THE SET BACK B, USUALLY 1/4".

TO GAUGE THE DEPTH OF THE GAIN, SET THE GAUGE FOR THE THICKNESS OF THE LEAF OF THE BUTT HINGE AND MARK THE DOOR AND THE JAMB. THE SPACE BETWEEN THE LEAVES ALLOWS FOR CLEARANCE AT THE BUTT EDGE OF THE DOOR. MOST BUTT HINGES ARE SWAGED FOR THIS CLEARANCE, BUT SOME SMALL BUTT HINGES ARE STRAIGHT. FOR STRAIGHT BUTT HINGES SET THE GAUGE FOR SLIGHTLY LESS THAN HALF THE THICKNESS OF THE BARREL

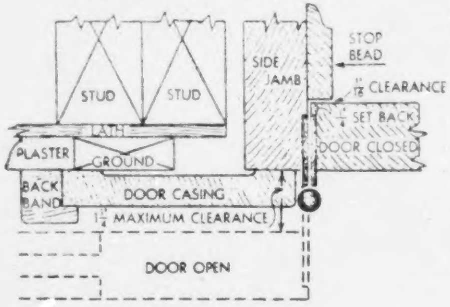

JAMB
B
C
DOOR
STOP
E
E
JAMB
STOP
DOOR

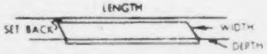

E
SWAGED
NOT SWAGED

HOW TO HANG A DOOR

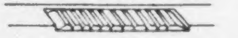
1. SAW OFF LUGS (THE PROJECTING ENDS OF THE STILES) AT TOP AND BOTTOM OF DOOR.
2. PLANE THE BUTT STILE TO FIT SIDE JAMB. PLANE TO THE CORRECT WIDTH OF THE OPENING AT TOP AND BOTTOM AFTER SUBTRACTING 1/8" FOR CLEARANCE, OR 1/16" FOR EACH SIDE. THE LOCK STILE SHOULD BE BEVELED SLIGHTLY.
3. PLANE DOOR TO FIT AT THE TOP, THEN SCRIBE AND PLANE THE BOTTOM ALLOWING 1/16" FOR CLEARANCE AT THE TOP AND 1/4" OR MORE AT THE BOTTOM FOR RUGS.
4. WEDGE THE DOOR IN PLACE AND MARK THE POSITION OF THE BUTT HINGES ON THE DOOR AND JAMB AT THE SAME TIME, AS ILLUSTRATED.
5. REMOVE THE DOOR AND SQUARE LINES WITH THE BUTT GAUGE FOR THE LENGTH OF THE BUTT HINGE OR GAIN. GAUGE THE WIDTH OF THE GAIN AND THE DEPTH OF THE GAIN WITH THE BUTT GAUGE. REPEAT ON THE JAMB.
6. CHISEL THE GAINS AS ILLUSTRATED. SEE STANLEY CHISEL CHARTS NO. C17 AND C18.
7. DRAW THE PINS FROM THE BUTT HINGES AND SCREW ONE LEAF TO THE DOOR AND ONE TO THE JAMB. SEE STANLEY SCREW DRIVER CHART NO. C21.
8. PUT THE DOOR IN POSITION AND SLIP THE PINS IN PLACE.
9. IF THE DOOR HANGS AWAY FROM THE JAMB THE GAINS SHOULD BE DEEPER. IF THE DOOR BINDS AGAINST THE JAMB PLACE A PIECE OF CARDBOARD BETWEEN THE BUTT HINGE AND THE BOTTOM OF THE GAIN.
10. THE STOP BEADS SHOULD THEN BE NAILED IN PLACE, ALLOWING CLEARANCE.

APPLICATION OF 3½"×3½" BUTT HINGE


STUD
STUD
LATH
PLASTER
GROUND
BACK BAND
DOOR CASING
SIDE JAMB
STOP BEAD
1/16" CLEARANCE
1/4" SET BACK
DOOR CLOSED
1½" MAXIMUM CLEARANCE
DOOR OPEN


LENGTH
SET BACK
WIDTH
DEPTH

LENGTH WIDTH AND DEPTH OF GAIN LAID OFF



GAIN SCORED AND ENDS NOTCHED TO AID IN CHISELING

GAIN FINISHED. THE BOTTOM SMOOTHED BY PARING WITH CHISEL

STANLEY TOOLS
NEW BRITAIN, CONN., U.S.A.

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CHART NO. 31
BY R. O. REGER

PRINTED IN U.S.A.

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UNIT XIV: DOOR AND [illegible]

TASK PACKAGE 5: SLIDING OR BI-FOLD DOORS

PREREQUISITES: [illegible] UNITS IX-XIII; UNIT XIV, TASK PACKAGES 1-4

RATIONALE:

Don't slide [illegible]. Get ready to install these sliding and bi-fold doors.

Sliding and bi-fold doors were developed primarily for use on closets and offer a space-saving feature since in most cases they do not project out into the room. Not only do they possess this practical feature, they also come in a variety of colors and textures lending beauty to the surroundings. There are two types of sliding doors; the pocket-type that slides into an opening in the partition, and the bypass-type which allows each door to slide by the other. The bi-fold door consists primarily of a pair of doors hinged together. These doors fold with the action being guided by an overhead track. In this task package you will learn how to install sliding or bi-fold doors according to plans and specifications. Continue, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to install sliding or bi-fold doors in a residential structure according to plans and specifications provided by the instructor; in addition, the specific door manufacturer's specifications and Unit 17 in Modern Carpentry will serve as standards for installation. Your finished job will be evaluated by your instructor, using these standards as a checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XIV-5, starring Sliding Door.
2. Read pages 374-378 in Modern Carpentry, beginning with section entitled Sliding Doors (Pocket-Type) and ending with Window Trim.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Folding wood rule
3. Pencil
4. Pocket-type sliding door with hardware
5. Bypass-type sliding door with hardware
6. Bi-fold door with hardware
7. Screw driver

LEARNING PRACTICE (cont'd):

1. Study the plans and discuss with the instructor which types and sizes of doors will be installed in the house.
2. The following items pertain to the installation of the sliding doors (pocket-type):
    a. This type of sliding door usually consists of two doors, both of which slide into an opening in the partition.
    b. The door frame consists of a split side-jamb attached to a framework built into the wall.
    c. The rough opening in the structural frame should be large enough to include the finished door opening and pocket. See figure 17-37, page 375, in Modern Carpentry.
    d. The pocket framework and track are installed during the rough framing stages.
    e. Pocket-frame units are available in a number of standard sizes and the particular manufacturer's installation instructions should be followed closely when the frame is installed.
3. The following items concern the installation of the sliding doors of the bypass-type:
    a. Standard interior door frames can be used for a bypass sliding door installation.
    b. The track may be mounted below the head jamb or may be recessed.

LEARNING PRACTICE (cont'd):

See figures 17-40, page 376, and 17-41, page 377.

c. Sliding door hardware for bypass doors is packaged complete with track, hangers (rollers), floor guide, screws, and manufacturer's instruction which must be followed closely when the doors are installed.

4. The following items relate to the installation of the bi-fold doors:

   a. The opening for bi-fold units is trimmed with standard jambs and casing. See figure 17-42, page 377, in Modern Carpentry.

   b. Bi-fold door units are installed as described on pages 376-377 and as illustrated in figure 17-43, page 377, in Modern Carpentry.

   c. Standard door designs are shown in figure 17-44, page 377, in Modern Carpentry.

   d. Folding door hardware is supplied in a package, along with the particular manufacturer's instructions for installation. These instructions should be followed closely in the installation of bi-fold doors.

5. After the installation of the doors covered in this package have been checked by you, seek the evaluation of the instructor.

LEARNING PRACTICE (cont'd):

6. Upon satisfactory completion of the doors' installation you will be directed to the next task package.

Through the installation of these doors you have opened up new knowledge concerning the carpentry trade.

UNIT XIV: DOOR AND INTERIOR TRIM

TASK PACKAGE 6: WINDOW TRIM

PREREQUISITES: UNITS I-VII; UNITS IX-XIII; UNIT XIV, TASK PACKAGES 1-5

RATIONALE:

Don't trim your sails at this point. Trim the windows instead, and open them on new carpentry knowledge.

The windows that you installed in the house some time ago now need your attention again. This time you are to install interior trim, which consists of head and side casing, the stool, and apron. These trim members should be cut and fitted into place with great accuracy and skill. They serve a practical purpose; that of covering the exposed jambs. They also contribute to the overall beauty of the finished room. Usually these trim members may be purchased from mill work companies with this trim being packaged in the correct length to finish a given unit or combination of units. Ready to cut and install the window trim in your house? Continue, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install window trim in a residential structure according to plans and specifications supplied by your instructor, using pages 378-379 in Modern Carpentry as a standard. Your work will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XIV-6, a real trim production.
2. Read and study pages 378-379, the section entitled Window Trim in Modern Carpentry.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Finishing nails
3. Nail set
4. Combination square
5. Crosscut saw
6. Electric miter box
7. Folding wood rule
8. Pencil

1. Check the house plans and discuss with your instructor in order to determine what type of window trim is to be installed.
2. The following items should be considered when installing window

LEARNING PRACTICE (cont'd):

trim:

a. A complete side of interior window trim consists of casing, stool, apron, and stops. See figure 17-47, page 378, in Modern Carpentry, for an illustration which shows the component parts of window trim and their relationship with each other.

b. The stool is applied first, lapping over the sill and extending beyond the side casings. Refer to page 378 and figure 17-47, in Modern Carpentry for the exact installation procedure.

c. Apply the side casing next, by setting a piece in position on the stool and marking the position of the miter. Set the casing back from the jamb 1/8". Cut the miter and install the side casing in place using the correct size nails. See page 378 and figure 17-48 on page 379 in Modern Carpentry.

d. Cut and install the other side casing, setting the nails in place with a nail set.

e. After both side casings have been nailed into place, cut and apply the head casing.

f. The last trim member to be installed will be the apron. Cut it to length (equal to the distance between the outside edges of the side casing) and install it into place, following the procedure covered on page 379 in Modern Carpentry.

LEARNING PRACTICE (cont'd):

g. After all trim members are in place, complete the nailing pattern and set the nails. See figure 17-51, page 379 in Modern Carpentry.

3. When you are certain that your window trim has been installed correctly, seek the evaluation of the instructor.
4. Upon satisfactory completion of this assignment you will be directed to the next task package.

Now that you have trimmed the inside of the windows and sharpened your carpentry skills still more, cut into the next assignment.

Keep your sails in trim, and voyage on to new carpentry skills.

C-XIV-7

UNIT XIV: DOOR AND INTERIOR TRIM

TASK PACKAGE 7: BASEBOARD AND SHOE MOLDING

PREREQUISITES: UNITS I-VII; UNITS IX-XIII; UNIT XIV, TASK PACKAGES 1-6

RATIONALE:

Shoe yourself into this task package and get down to basics again - baseboards, that is. Mold yourself some new carpentry skills right here.

After the walls in your house have been finished and the floors have had the finished covering applied, two additional trim members should be installed. These pieces of trim are the baseboard and shoe molding, and they serve to cover the space between the finished floor and the finished wall. In addition to providing for the utilitarian purpose, these trim members lend a beauty to the overall appearance of the house. In this task package you will learn how to cut and install baseboard and shoe molding according to plans and specifications. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install baseboard and shoe molding in a residential structure according to plans and specifications provided by the instructor maintaining the following standards:

a. baseboard fits flush against the finished floor and wall and is cut to the correct length (± 1/16").

b. inside corner joints are coped showing no more than a 1/32" space.

c. outside corner joints are mitered with no more than a 1/32" space.

d. molding is attached to studs and sole plate using appropriate finish nails.

e. shoe molding fits flush against the baseboard and floor and is cut to the correct length (± 1/16").

f. inside corner joints of the shoe molding are coped, showing no more than a 1/32" space.

g. outside corner joints are mitered with no more than a 1/32" opening showing.

h. shoe is attached to the baseboard and subfloor with the appropriate finish nails.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package C-XIV-7, starring Count Baseboard.
2. Read pages 380-382 in Modern Carpentry.
3. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Nails
3. Coping saw
4. Block plane
5. Nail set
6. Electric miter box
7. Combination square
8. Folding wood rule
9. Baseboard material
10. Shoe molding material

1. Study the plans and confer with the instructor to determine the size and kind of baseboard and shoe molding which are to be installed in the house.
2. The following items should be considered in the installation of the baseboard:
   a. Baseboards run continuously around the room between door openings, cabinets, and built-ins, with the joints at internal corners being coped and at external corners being mitered. See figure 17-53, page 380, in Modern Carpentry.

LEARNING PRACTICE (cont'd):

b. Select and place the baseboard around the sides of the room, so that a minimum amount of cutting and waste will be incurred. See page 380, in Modern Carpentry for this procedure.

c. Measure, cut, and fit the first piece of baseboard against the wall so that its square end is butted tightly against the intersecting wall.

d. The second piece is coped to fit into the corner and against the first piece. See figures 17-53, 17-54, and 17-55 on page 380 in Modern Carpentry for illustration of this process. Also note the discussion on page 380, which describes the procedure by which a joint is coped.

e. All outside corners are joined with a miter joint. See page 381 and figure 17-56 in Modern Carpentry for the procedure.

f. The baseboard should be nailed in place with the proper size finishing nails and set into place following the procedure outlined on page 381 and shown in figure 17-57 in Modern Carpentry.

g. Baseboards are butted against the door casings as shown in figure 17-58 in Modern Carpentry.

3. The following items should be considered when installing the

LEARNING PRACTICE (cont'd):

shoe molding:

a. Base shoe (shoe molding) is used to cover the space between the finished floor and the baseboard. See figure 17-52, page 379, in Modern Carpentry.

b. Shoe molding is usually installed at the same time as the baseboard, however, it may not be nailed permanently in place until after the surface finish (lacquer, varnish, paint) has been applied.

c. Shoe molding is also used to cover the edge of tile or carpet.

d. Shoe molding installed in much the same manner as the baseboard; that is, the interior joints are coped and the exterior joints are mitered.

e. When it becomes necessary to fit shoe molding against the door casing, it should be mitered as shown in figure 17-58, page 381, in Modern Carpentry.

f. When nailing the shoe molding in place, properly sized finishing nails are used and driven into the baseboard and subfloor, then set with the nailset.

4. When all the baseboard and shoe molding have been installed, evaluate your finished work against the standards in the Objective. Now seek the evaluation of your instructor.

LEARNING PRACTICE (cont'd):

5. Upon satisfactory completion of the finished job, you will be directed to the last assignment in the course.

With the competent jobs you have done in this course, we feel you will be a [illegible] to the carpentry trade.

UNIT XIV: DOOR AND INTERIOR TRIM

TASK PACKAGE 8: METAL THRESHOLD

PREREQUISITES: UNITS I-VII; UNITS IX-XIII; UNIT XIV, TASK PACKAGES 1-7

RATIONALE:

If a new bride is to be carried across the threshold, there has to be an installed threshold. So, as a competent carpenter, you should be able to install thresholds so that brides may be carried across them. Learn how to install them here and win the gratitude of new husbands.

The last item to be installed in constructing the house is the metal threshold. For many years oak or other hardwood thresholds have been used to seal the space between the bottom of the exterior door and the door sill. Now wooden thresholds are usually equipped with rubber or vinyl sealing strips. Today, however, there are a wide range of metal thresholds made from extruded aluminum, finished in a multitude of colors. Special vinyl strips are inserted into the threshold, and these strips provide an effective seal when they fit against the bottom of the outside door. In this task package you will learn how to cut and install a metal threshold according to plans and specifications.

Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to cut and install a metal threshold in a residential structure according to plans and specifications supplied by the instructor maintaining the following standards:

a. threshold is cut and notched to fit the door opening with no more than 1/32" clearance showing.

b. when properly installed the threshold will allow the door to open and close easily.

c. threshold manufacturer's detailed instructions are followed.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package __________, a real door stopper.
2. Read page 373, the section entitled Thresholds and Door Bottoms in Modern Carpentry.
3. This concludes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Hammer
2. Nails
3. Combination square
4. Folding wood rule
5. Hack saw
6. Pencil
7. Screw driver
8. Metal threshold units

1. Study the plans and discuss thresholds with your instructor to determine what type threshold you are to install.
2. The manufacturer's installation instructions should be followed closely as the threshold is put into place.
3. Following the manufacturer's instructions the threshold should be measured, laid out, and cut so that it will be notched to fit properly into the door opening.
4. Fasten the threshold into place following the specific instructions provided.
5. Insert the vinyl strip into place to fit against the beveled door bottom. See figure 17-33 on page 373 in Modern Carpentry.
6. Check your finished installation and, when satisfied, contact your instructor for his evaluation.
7. Upon satisfactory completion of this assignment you will have completed task package 8, Unit XIV, and the carpentry course.

LEARNING PRACTICE (cont'd):

You have just finished an assignment in which you installed a threshold, but you have progressed much beyond this. You have just passed through and completed a series of assignments for which you gained skill and confidence and, in addition, you have learned to appreciate good craftsmanship. With the new skills and competencies that you have gained in this course you should now be prepared to enter into the carpentry trade and, if you pursue it with the same enthusiasm exhibited thus far, there is no reason you should not be very successful.

Remember, keep working and studying hard and, above all, keep smiling.